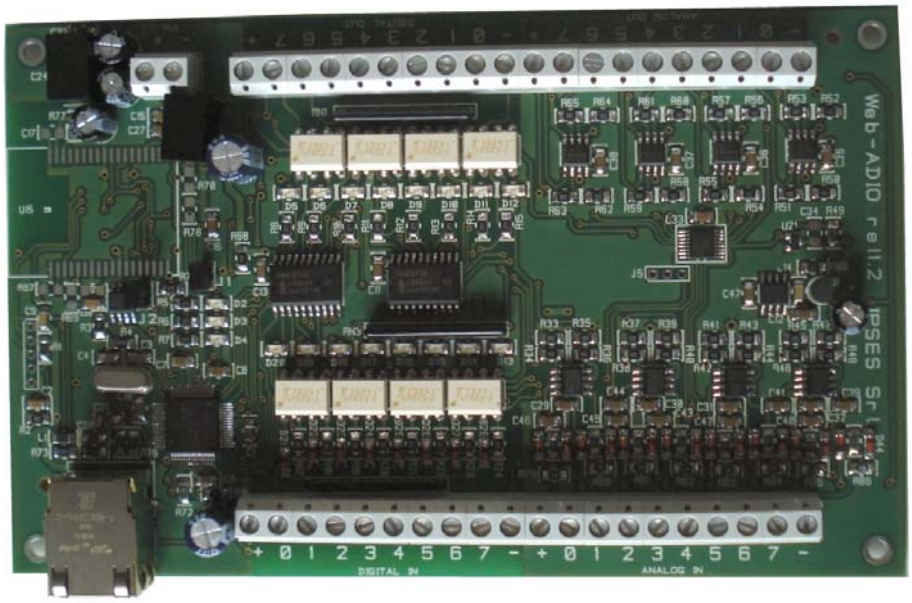
WEB-ADIO Control Unit
USER MANUAL

Rel. 01.02.0001
(Hardware code: WEB-ADIO)



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WARNING!
ELECTRICAL DEVICES COULD DAMAGE EQUIPMENT OR PROPERTY OR CAUSE PERSONAL INJURY

This guide contains instructions and technical features of the WEB-ADIO Control Unit.
Read with attention before attempting to install.
It is the responsibility of the technician to undertake all the safety rules provided by the law during the installation and the use of this device.
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TABLE OF CONTENTS

REVISION HISTORY 6
GENERAL FEATURES 7
CARD DESCRIPTION 8
FUNCTIONING MODES 16
LED STATUS 16
POWER SUPPLY 17
ETHERNET MODULE 18
NETWORK SERVICES 19
ADDRESSES CONFIGURATION 19
http SERVER 21
telnet SERVER 32
SNMP SERVER 36
PROBLEMS RESOLUTION: 39
DEMO SOFTWARE 40
TCP/IP ADDRESS CONFIGURATOR SOFTWARE 46
PRODUCT CODE 51
TECHNICAL FEATURES 51
OTHER AVAILABLE I/O CARDS 53
CONTACTS 60
SUPPORT INFORMATION 61
PROBLEM REPORT 61
ENGINEERING PROBLEM REPORT 62

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REVISION HISTORY

Manual revision history

Revision/ Date	Change description	Author
01.00.0000 August, 2010	First version Released	Rivolta A.
01.01.0000 November, 2010	Added paragraph "Ethernet Module". Added paragraph "I/O Management through http". Updated "*telnet Server*" paragraph. Added description for storing trap parameters in the "*SNMP Server*" paragraph. Updated "*Technical features*" paragraph. Update section "*Other I/O cards available*".	Rivolta A.
01.02.0000 April, 2011	Added Security Funciton description in "*http Server*" paragraph and updated "*telnet Server*" and "*TCP/IP Address Configurator Software*" paragraphs. Removed description of the temperature sensor and updated the technical characteristic information about analogical inputs.	Rivolta A.
01.02.0001 June, 2015	Update layout document	Bottaccioli M.

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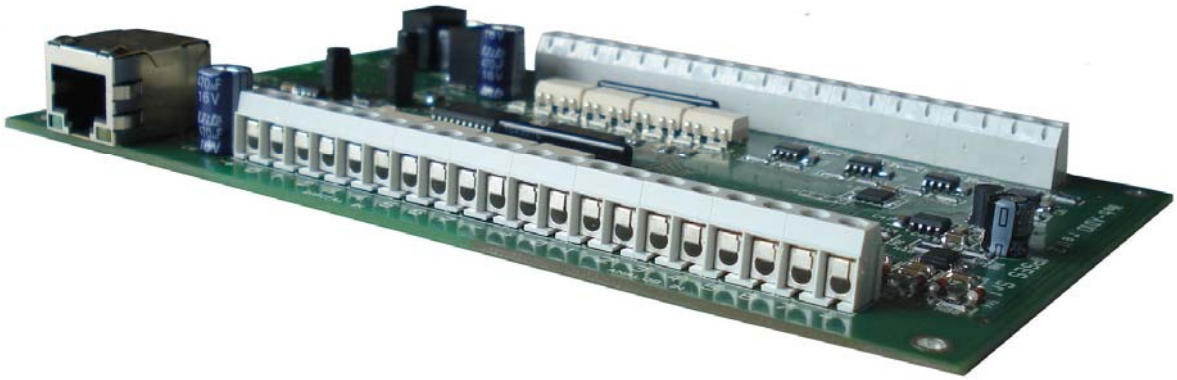
GENERAL FEATURES

WEB-ADIO is a control unit integrated on a *European Card* Format (160 x 100 mm – 6,30 x 3,94 inches) equipped with Ethernet interface.
The card needs an external power supply (from 15V to 32V, continuous current) to operate.
WEB-ADIO can acquire and control digital and analogical signals. The digital interface consists of eight optocoupled inputs and eight optocoupled outputs.
The analogical interface can acquire eight inputs and drives eight outputs, both of them included in a 0-10V voltage range and with a resolution of 10bit. Each analogical I/O is individually calibrated.
Analogical and digital channels are reciprocally isolated.
The control and the configuration of the device are achieved through Ethernet interface thanks to an *http* browser or a MIB browser, or a *telnet* client, or using the demo software provided with.
User can set the status of each output at the power-up: this status will be saved in a non volatile memory.
The card allows to perform a firmware upgrade directly from web page, without needs any external hardware or software component.



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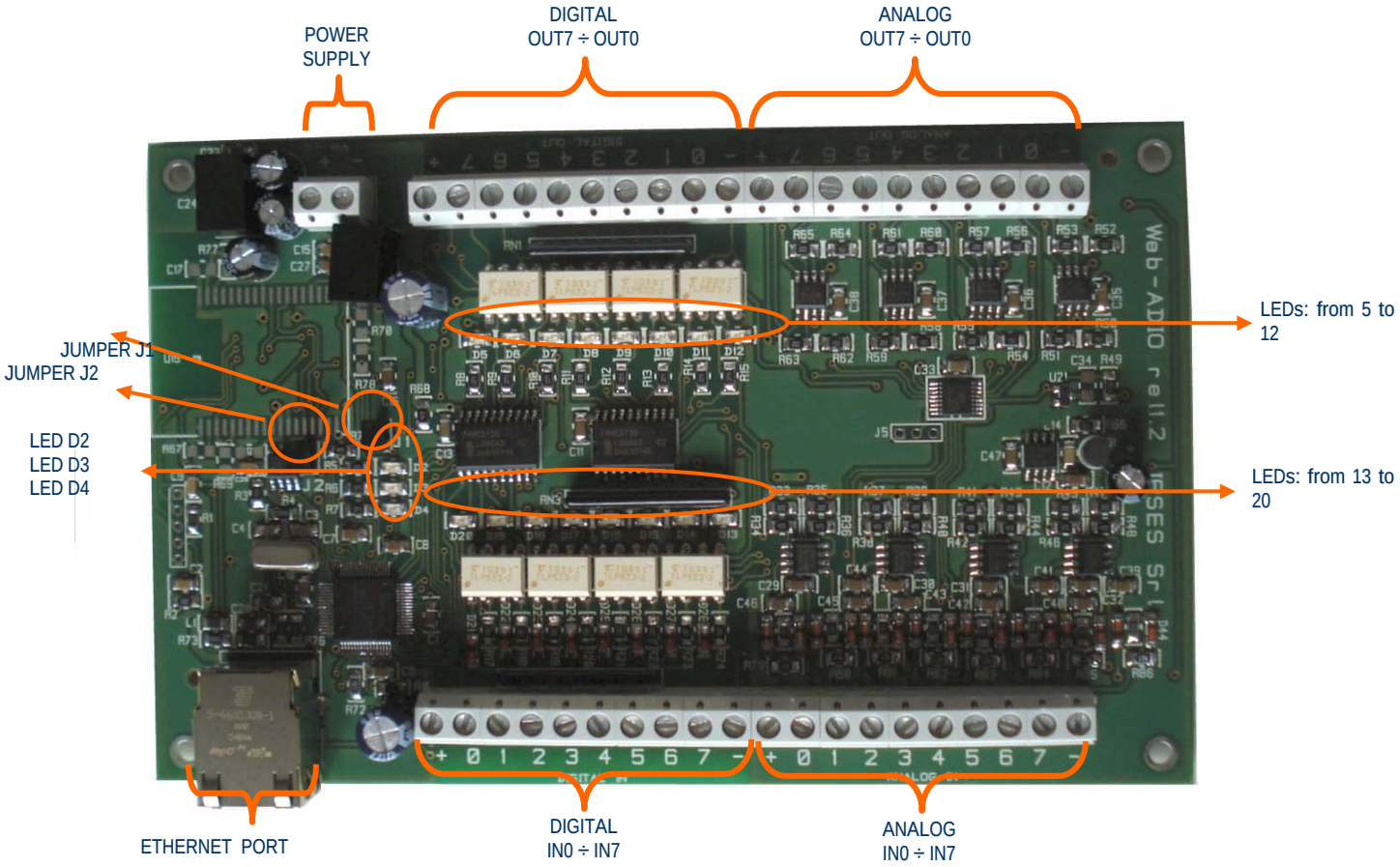
CARD DESCRIPTION

WEB-ADIO card is shown in the picture below: in the upper part of the card the digital and analogical outputs are divided in two groups of eight (numbered from 0 up to 7 on the card serigraphy), and, similarly, in the lower part of the card there are the digital and analogical inputs (numbered and divided in the same way).



Picture 1: WEB-ADIO card

Description of the LEDs:

D2	Green LED: Status LED (see relevant paragraph)
D3	Green LED: Status LED (see relevant paragraph)
D4	Red LED: Status LED (see relevant paragraph)
D5	Red LED: digital OUT 7 activated
D6	Red LED: digital OUT 6 activated
D7	Red LED: digital OUT 5 activated
D8	Red LED: digital OUT 4 activated
D9	Red LED: digital OUT 3 activated

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D10	Red LED: digital OUT 2 activated
D11	Red LED: digital OUT 1 activated
D12	Red LED: digital OUT 0 activated
D13	Green LED: V_{high} applied at digital IN 7
D14	Green LED: V_{high} applied at digital IN 6
D15	Green LED: V_{high} applied at digital IN 5
D16	Green LED: V_{high} applied at digital IN 4
D17	Green LED: V_{high} applied at digital IN 3
D18	Green LED: V_{high} applied at digital IN 2
D19	Green LED: V_{high} applied at digital IN 1
D20	Green LED: V_{high} applied at digital IN 0

Description of the jumper:

J1	Reserved for further use
J2	Hardware reset with factory parameters restoration / Address Configuration mode (see paragraph "ADDRESSES CONFIGURATION")

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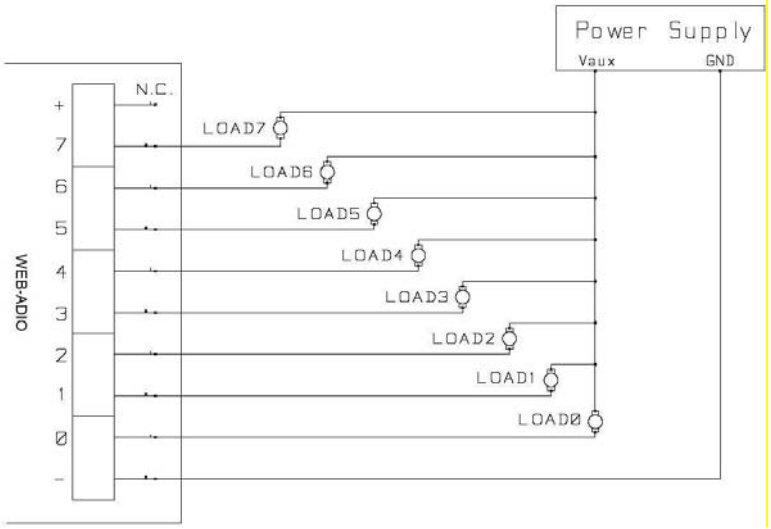
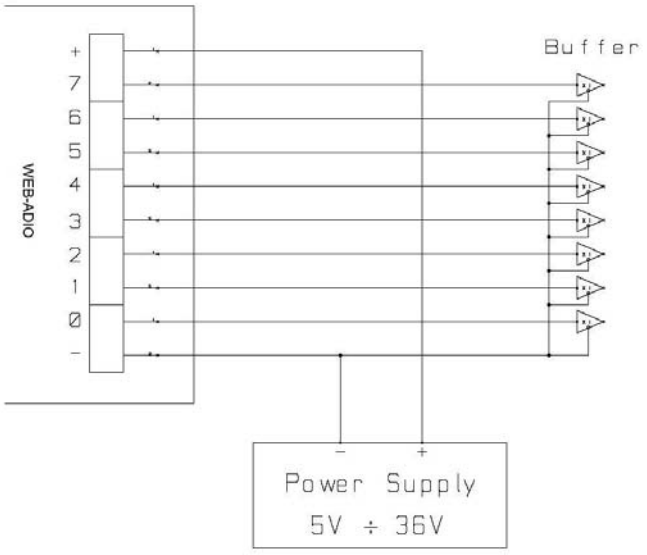
OUTPUTS

Digital interface:

The eight digital outputs are completely isolated, with either all control signals on the device, both with analogical outputs. Here below there are the diagrams of two typical connections of external device to WEB-ADIO card: in the first case (Picture 2a), the card will manage directly some loads (with maximal current of 150mA). In the second case (Picture 2b), the card is connected to a high impedance device (i. e. the inputs of a PLC).



Picture 2a: diagram of the digital output connections: directly managing of loads



Picture 2b: diagram of the digital output connections: connection to a high impedance device

Output status is displayed by LEDs placed near every connector (LED from D5 to D12, showed in Picture 1).

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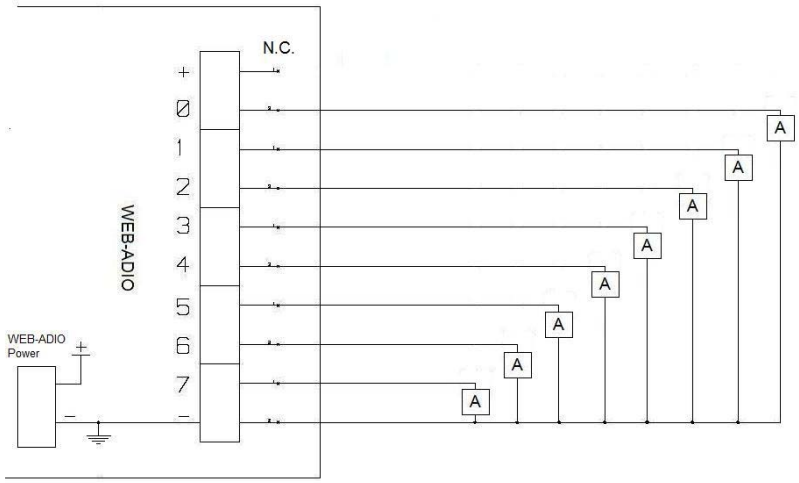
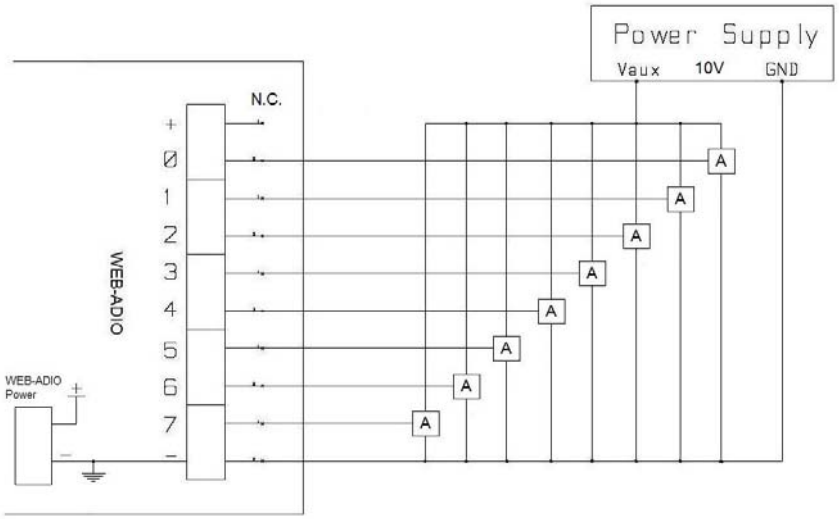
Analogical interface:

Each analogical output has a resolution of 10bits with a 0-10V voltage range and a low impedance driver and they are independent among them. As a negative voltage reference you must consider the ground output of the card. The maximum provided or absorbed output current is 25mA.
Here below there are the diagrams of two typical connections of analogical actuators to WEB-ADIO card.
In the first case, see Picture 2c, the board drives directly the loads, with a maximum current of 25mA for each output.
In the second case, see Picture 2d, the actuators are powered from an external supply source: it is mandatory to connect together the negative voltage references. Where the actuators have an operating range greater than 10V and should use their whole dynamic, you must be placed between the outputs of the card and the actuators themselves a signal conditioning circuit control.
In the third case, see Picture 2e, the supply of the actuators is taken from the card.



Picture 2c: diagram of the analogical output connections: managing of actuators with external power supply



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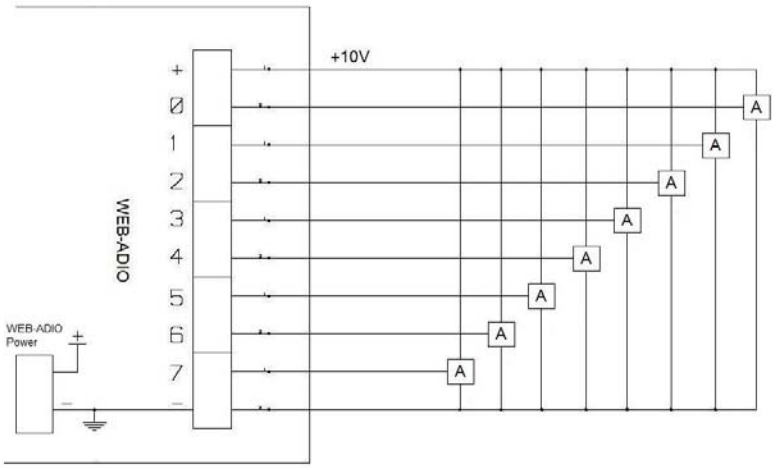
Picture 2d: diagram of the analogical output connections: managing of actuators with external power supply



Picture 2e: diagram of the analogical output connections: managing of actuators with power taken from the card

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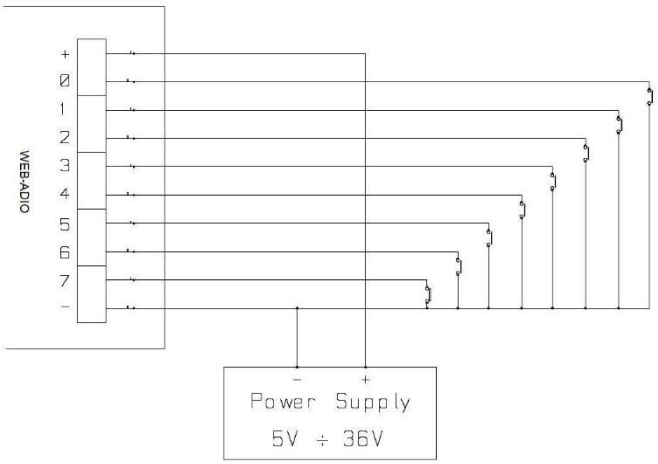
INPUTS

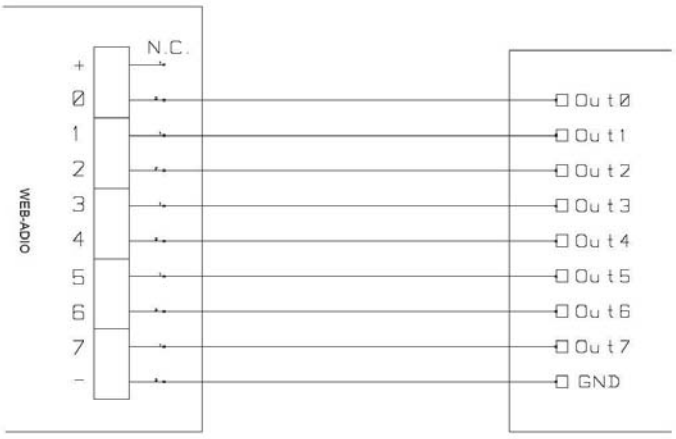
Digital interface:

The eight digital inputs are completely isolated, with either all control signals on the device, both with analogical inputs.

We suggest to connect inputs following one of the two diagrams displayed below:
-Picture 3a: use this way in case inputs have to detect the pressure from a switch or an open collector output.
-Picture 3b: use this way in case inputs are directly controlled by a voltage.



Picture 3a: diagram of input implementation: detection of the pressure from a switch or an open collector output



Picture 3b: diagram of input implementation: inputs directly controlled by a voltage

Input status is displayed by LEDs placed near every connector (LED form D13 to D20, showed in Picture 1).

Analogical interface:

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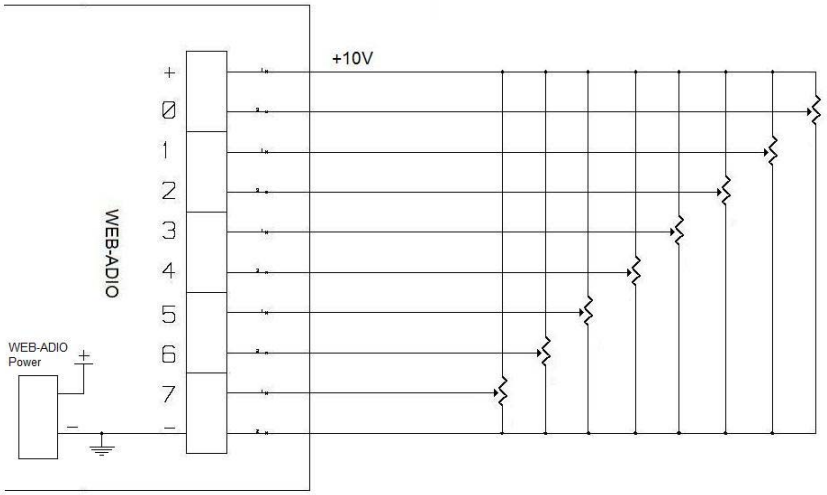
All analogical inputs have an input impedance greater than 1MΩ and an hardware protection against overvoltage conditions. The resolution of the acquired signal is 10bits, in the 0-10V voltage range.
The following picture shows a typical connection among analogical inputs and linear transducers. The power supply is taken from the WEB-ADIO card.



Picture 3b: diagram of input implementation: inputs directly controlled by a voltage

Alternatively, it is possible to take an external power supply: in this case it is mandatory to connect together the negative voltage references. A signal conditioning may be necessary to fit the 0-10V range.

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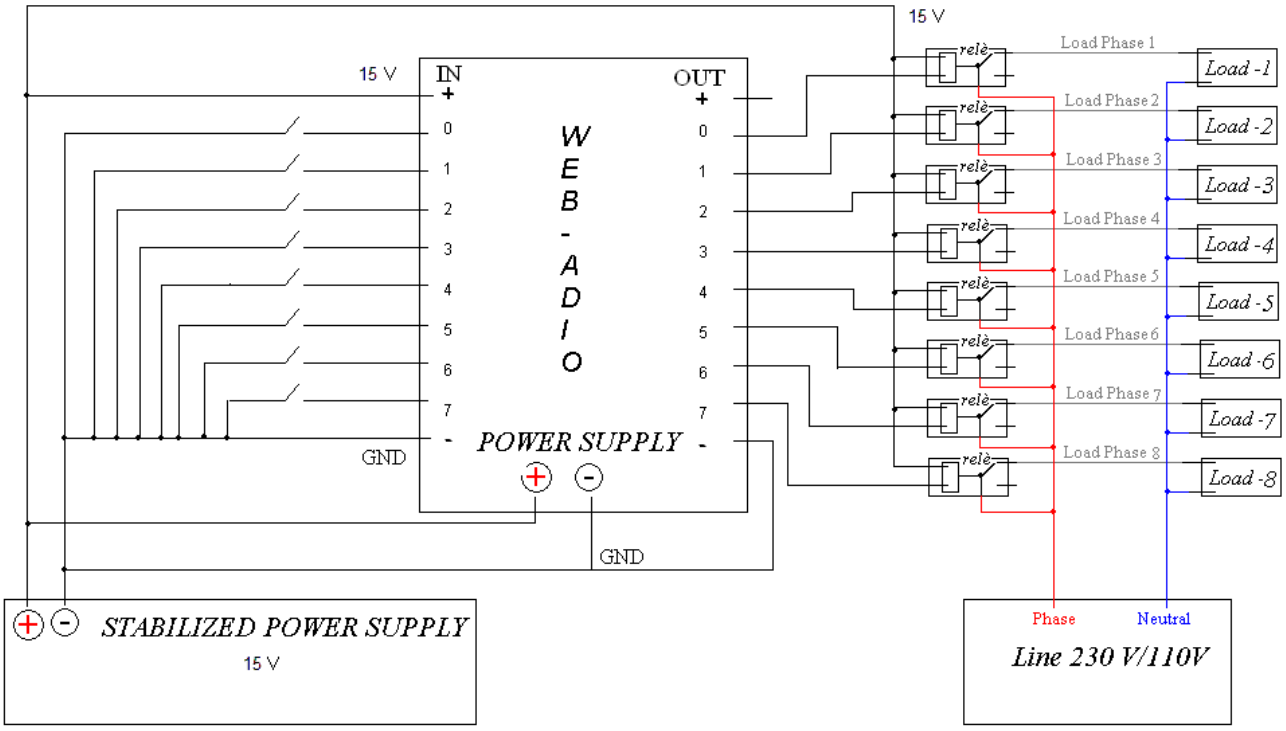
EXAMPLE OF USAGE

The follow example, in Picture 4, shows how you can connect the digital channels of the WEB-ADIO for manage an external load with line supply.



Picture 4: external load with line supply management

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FUNCTIONING MODES

The firmware of the board implements two different modes, as specified in the following table.

Mode	Descrizione
Operative	This is the normal mode. During this status, the control of the outputs and PLC and Timeout functions are fully available. The interaction with the board can made by web browser, MIB browser, client telnet, or demo software.
Bootloader	Using this mode, the board waits for a firmware upgrade or a return to Operative mode. In this state all the outputs and PLC and Timeout function are disabled. The interaction with the board can only made by a web browser.

LED STATUS

The LEDs D2, D3 and D4 indicate the status of the system.
In *Operative* mode the LED configuration is the following one:

LED D2	LED D3	LED D4	Status Description
On	On	Blinking	Board correctly configured and operative
Blinking	Blinking	/	Hardware resetting to factory settings or software TCP/IP address configuration
On	Blinking	/	*telnet* password modifying

If D2 or D3 are Off, there is, respectively, an hardware or a firmware initialization error.

In *Bootloader* mode the LEDs D2, D3 and D4 light up repetitively in sequence, until one remains in this state.

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POWER SUPPLY

The board is equipped with a connector (see next Picture: the connector labeled as "VIN") which allows to connect an external voltage supply to power the board: its value must be included from +15V up to +32V.
The voltage supply can be used also as "*Power Supply*", as indicated in Picture 2b and 3a: by these way, the galvanic isolation of the board between I/O and control logic will be lost, so the GNDs must be connected together to avoid irreversible damage of the card.

WARNING!
The maximum supply voltage must not exceed +32Vdc: in case of use of higher voltage the components of the board may damage irremediably.

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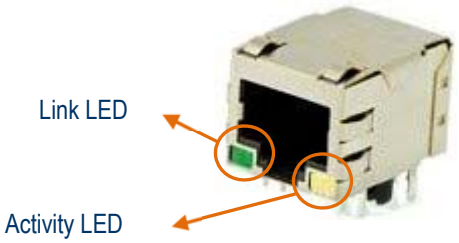
ETHERNET MODULE

The physical layer of the Ethernet network protocol supports the 10Base-T standard and it is fully compliant with the 10/100/1000Base-T standard. The WEB-ADIO can be connected to any commercial router or switch without problems.
The physical connection between the card and the network cable is made by the RJ45 connector, as shown in the following picture:



The green LED (*Link* LED) indicates the detection of the Ethernet network, the yellow LED (*Activity* LED) is on during the communication packets Tx/Rx activity.

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NETWORK SERVICES

WEB-ADIO board hosts a server for *http* service, a server for *telnet* service and a server for SNMP (Simple Network Management Protocol) service. Data transfer is based on a TCP/IP protocol: the protocol configuration parameters can be modified only from *http* service or the "TCP/IP ADDRESS CONFIGURATOR SOFTWARE" described in a later paragraph. To validate these changes a password named *http* service password is required.
Similarly, to access *telnet* service an authentication password named *telnet* service password is required.
Both passwords are case-sensitive alphanumerical strings with a valid length included between 1 and 8 characters. The default value for both is "ipses" and it can be modified only from the relevant service.
The SNMP service supports both V1 and V2c versions. The last one implements a community-based service access, which is an authentication access method. It is possible to set up to 3 different communities both for read and write operations.
The default communities are:

- *Write Community* ("*private*", "*write*", "*public*")
- *Read Community* ("*public*", "*read*", "").

Each specified community can be 8 chars maximum length; if none community is specified, the access to the pertinent service (read and/or write) is blocked.

ADDRESSES CONFIGURATION

The following table shows the default configuration parameter of each board:

Parameter	Value
Hostname	WEBADIOBOARD
IP address	192.168.0.16
Subnet mask	255.255.255.0
Gateway address	192.168.0.4
Primary DNS	193.70.152.15
Secondary DNS	0.0.0.0
http password	ipses
telnet password	ipses
Startup status outputs	Digital: all OFF Analogical: all 0V
Security Level	0

The addresses for Primary DNS server and Secondary DNS server must be modified according to the addresses assigned from the network's provider where you connect your board. For more information contact your network provider.

It is possible to restore factory parameters following this procedure:

- disconnect power supply from the board
- insert jumper J2 (see Picture 1 at page 8)
- connect power supply to the board

If the procedure is successfully completed, LEDs D2 and D3 will flash alternatively for about 3 seconds. At this point it will be possible to remove jumper J2 form the board.

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If TCP/IP parameters of the network are not compatible with default board parameters, or if the IP address is already assigned to another device, you can reconfigure them choosing between the following two procedures:

- Manual configuration procedure
  - connect the board locally and directly to a PC equipped with a network card (without connect it to any network).
  - verify that in the *Property* items under *Local Network Connection Status (LAN)* window located in *Control Panel » Network Connection Properties* path the IP address of your PC is 192.168.0.1 and their Subnet Mask is 255.255.255.0. Otherwise set these values in their respective fields.
  - power on the board and access to *http* service typing in the URL browser the current board address (by default http://192.168.0.16/).
  - go to the *TCP/IP Configuration* page, then set the new parameters and save them. Verify Save & Reboot operation works successfully.
  - install the card in the network and access it with new parameters.
- Software configuration procedure
  - with the board already powered on, insert the jumper J2.
  - Run the address configurator software "WEB-IO Board Address Configurator.exe" included in the installer CD provided with the board, and follow the steps described in the paragraph "TCP/IP ADDRESS CONFIGURATION SOFTWARE".
  - at the end of the configuration, remove jumper J2.

IMPORTANT: do not disconnect the power supply during the address configuration procedure: a supply reset restore factory parameters.

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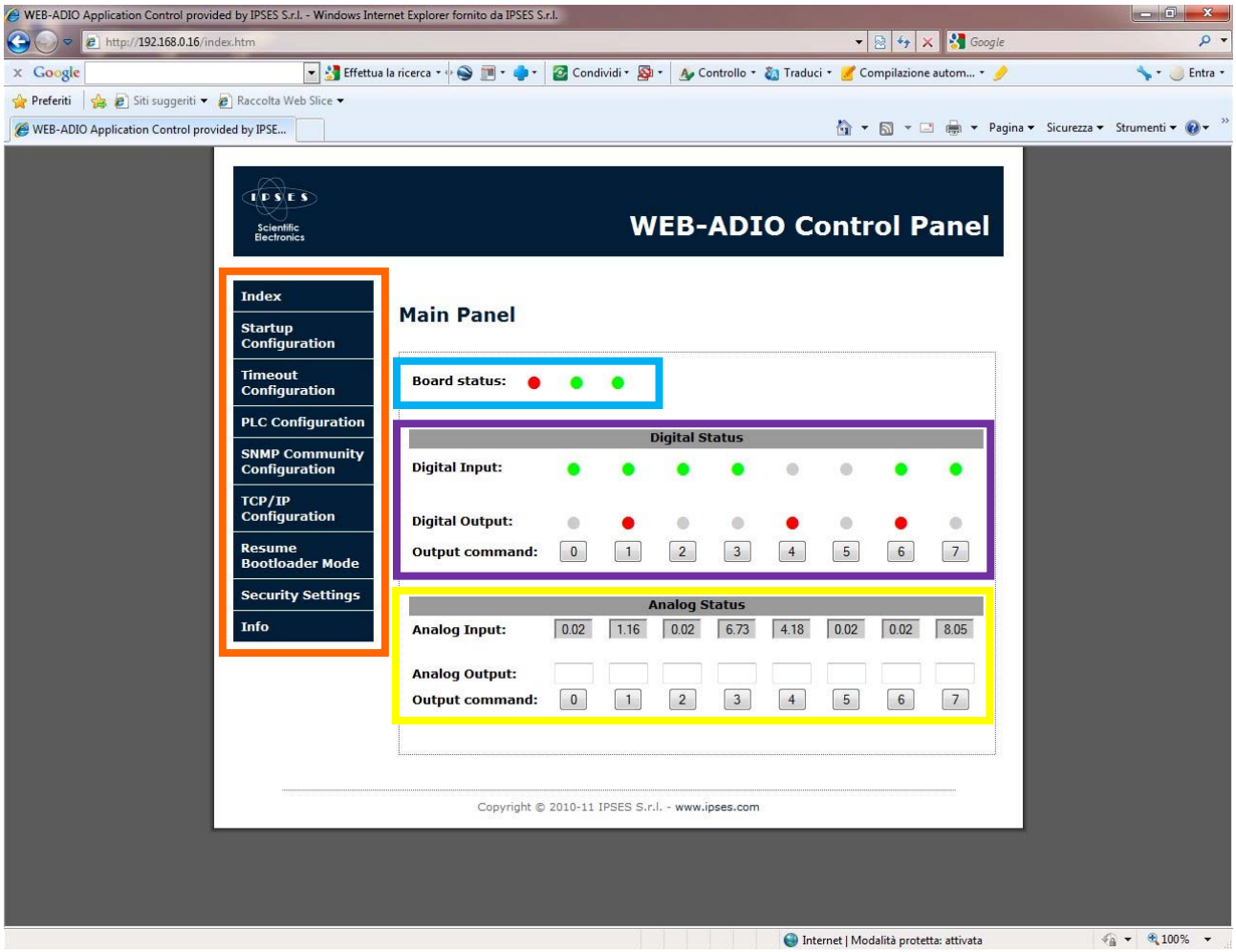
http SERVER

The *http* server implemented on the board allows to manage up to 5 simultaneous sessions.
To access the server, open a web browser and type the board IP address http://192.168.0.16/ in the URL field: you will be redirect to the main page, *index.htm*, as shown in Picture 5.
The implemented server was tested and was resulted fully compliant with the following browser:

- Microsoft Internet Explorer 8.0.7600.16385
- Mozilla Firefox 4.0
- Google Chrome 10.0.648.205
- Apple Safari 5.0.4 (7533.20.27)

To avoid undesired accesses to control function of the board we have developed a multilevel security function: its description is demanded later in this paragraph.



Picture 5: *http* server index page.

On the left side of the WEB-ADIO control panel there is the menu (surrounded in orange in Picture 5) which allows to access the pages implemented on the *http* server.
Board status (surrounded in blue) shows D2, D3 and D4 status LEDs mounted on the card.

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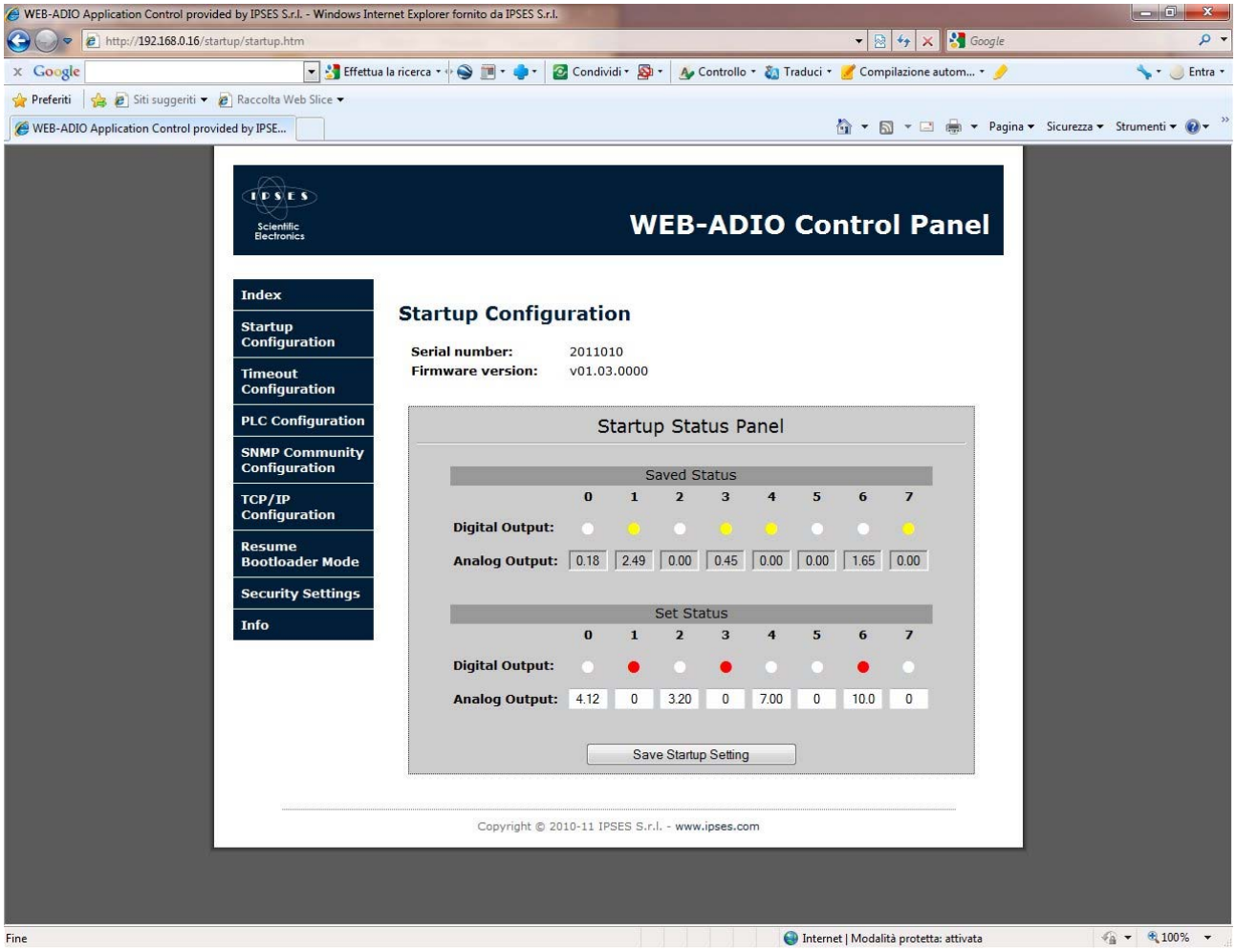
The section related to the I/O digital channel is surrounded in violet. *Digital Input* and *Digital Output* fields, report respectively the current status of each inputs and outputs of the digital channel. *Output command* buttons, labeled from 0 to 7, drive the outputs: each button pressure set or reset the relative digital output.
If the freezing function for http page commands is enabled, these buttons are disabled.
The filling colors used in the *http* page are correspondent to the LEDs mounted on the card.
The section related to the I/O analogical channel is surrounded in yellow. The *Analog Input* indicators show the read voltage from the corresponding input, measured in Volts. To set-up the outputs you must insert a valid voltage value, in the 0-10V range, in the *Analog Output* controls and click the associated *Output Command* button.
If the freezing function for http page commands is enabled, these buttons are disabled.
If the communication is lost the current page shows the following error message: "*Connection to WEB-ADIO board was lost*".



Picture 6: Startup configuration page.

Startup Configuration page, shown above in Picture 6, allows to read board parameters (like *Serial Number* and *Firmware Version*), and to set the startup digital and analogical outputs status through the *Startup Status Panel* form. *Saved status*

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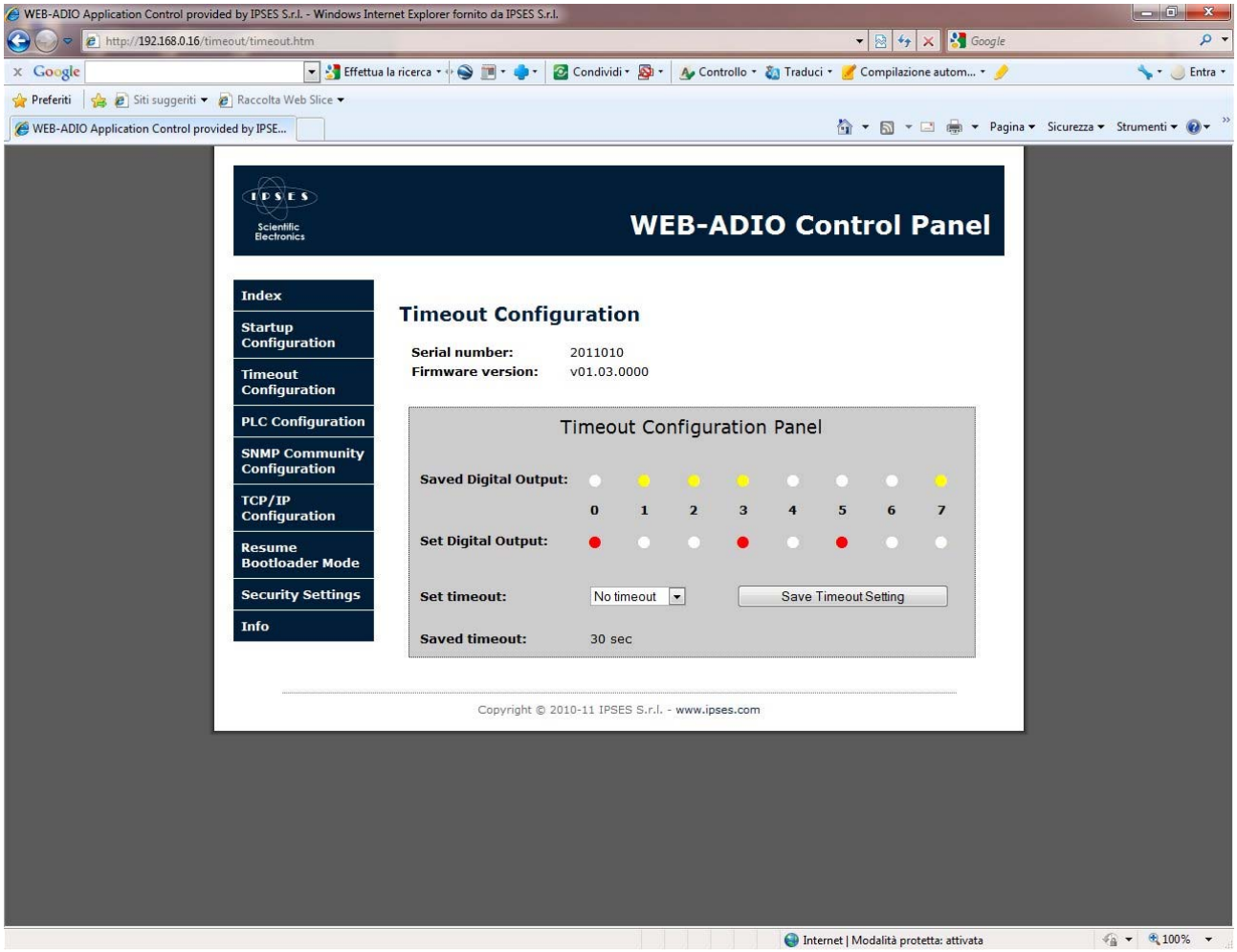
field displays the actual startup configuration stored in memory: digital outputs status is shown by yellow LEDs, while analogical outputs status is reported in the *Analog Output* indicators.
The *Set Status* field allows to set up a new startup configuration: for digital outputs by clicking on LEDs and for analogical outputs by typing a valid value, included in the 0-10V range, into the *Analog Output* control boxes.
The new startup configuration will be stored only after the pressure of *Save Startup Settings* button.
If the freezing function for http page commands is enabled, the button is disabled.



Picture 7: Timeout parameters configuration page.

Timeout Configuration page, shown in Picture 7, allows to read and to set the parameters of the Timeout function, that acts only on the digital outputs. *Saved status* field display the status of the digital outputs if the *Saved timeout* field time elapses with no commands or requests received by the board.
Clicking on LEDs of *Set status* field it is possible to set new digital outputs configuration, while *Set timeout* field allows to select the new timeout time among the following items: "*No timeout*", "*5sec*", "*10sec*", "*30sec*", "*1min*", "*5min*", "*10min*", "*30min*", "*1hour*". "*No timeout*" item disables the Timeout function on the board. The *Save Timeout Setting* button stores the new settings on the memory of the board.
If the freezing function for http page commands is enabled, the button is disabled.

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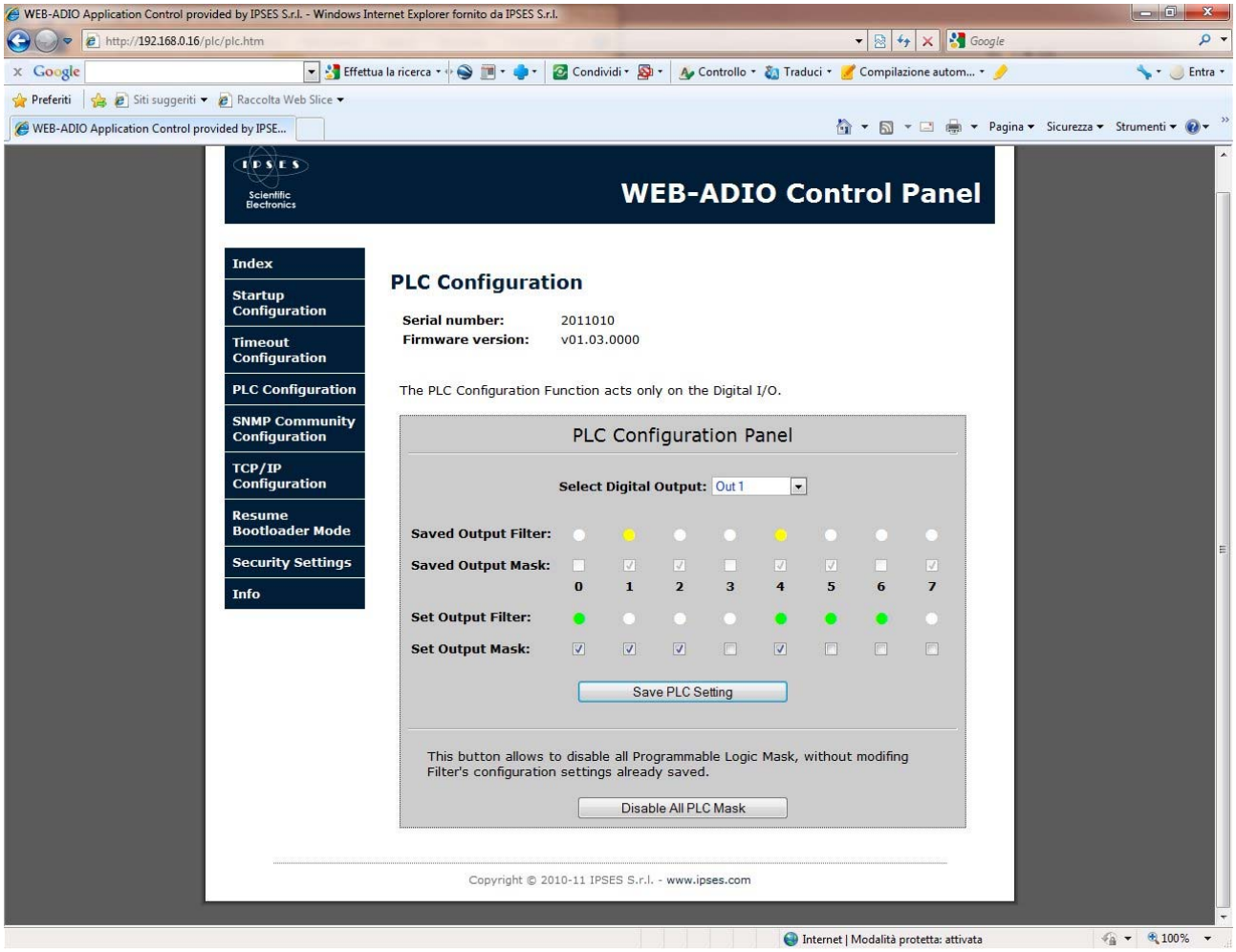
The Timeout function has priority over PLC function, described next. When the Timeout function occurs, the outputs will be sets as configured and remain in this status, while any active PLC logic will be temporarily disabled, until the board will not receive a new command or request.


WEB-ADIO Application Control provided by IPSES S.r.l. - Windows Internet Explorer fornito da IPSES S.r.l.
http://192.168.0.16/plc/plc.htm
WEB-ADIO Control Panel
Index
Startup Configuration
Timeout Configuration
PLC Configuration
SNMP Community Configuration
TCP/IP Configuration
Resume Bootloader Mode
Security Settings
Info
PLC Configuration
Serial number: 2011010
Firmware version: v01.03.0000
The PLC Configuration Function acts only on the Digital I/O.
PLC Configuration Panel
Select Digital Output: Out 1
Saved Output Filter:
Saved Output Mask:
0 1 2 3 4 5 6 7
Set Output Filter:
Set Output Mask:
Save PLC Setting
This button allows to disable all Programmable Logic Mask, without modifing Filter's configuration settings already saved.
Disable All PLC Mask
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Picture 8: Programmable Logic Configuration (PLC) page.

PLC Configuration page, shown in Picture 8, allows to manage each digital output in function of the customizable status of the digital inputs (from 0 to 7). For example, as shown in picture above, user can set the output n. 1 to switch on when digital inputs 1-4 are high and digital inputs 2-5-7 are low (other inputs are *don't care*).
To do this, select the desired output through the *Select Digital Output* ring in the upper part of the PLC configuration panel. In the same panel, the *Saved Output Mask* field and *Saved Output Filter* field show the stored values for that output. Clicking on *Set Output Mask* checkbox field and *Set Output Filter* LED field it is possible to configure new mask and filter settings. If an input is not masked, it will be not considered from the logic function, independently of its filter status selection. To make the new values operative, click on *Save PLC Setting*.
When the PLC function is enabled on an output, the output status will be set according the customizable input status. For this reason, it will be not possible to manually set that output until the PLC function is enable. To do this, user needs to disable the PLC function.
To disable the PLC function on an output, all inputs must be not masked: the relative item in the *Select Digital Output* ring will became grey, otherwise it will remain blue.

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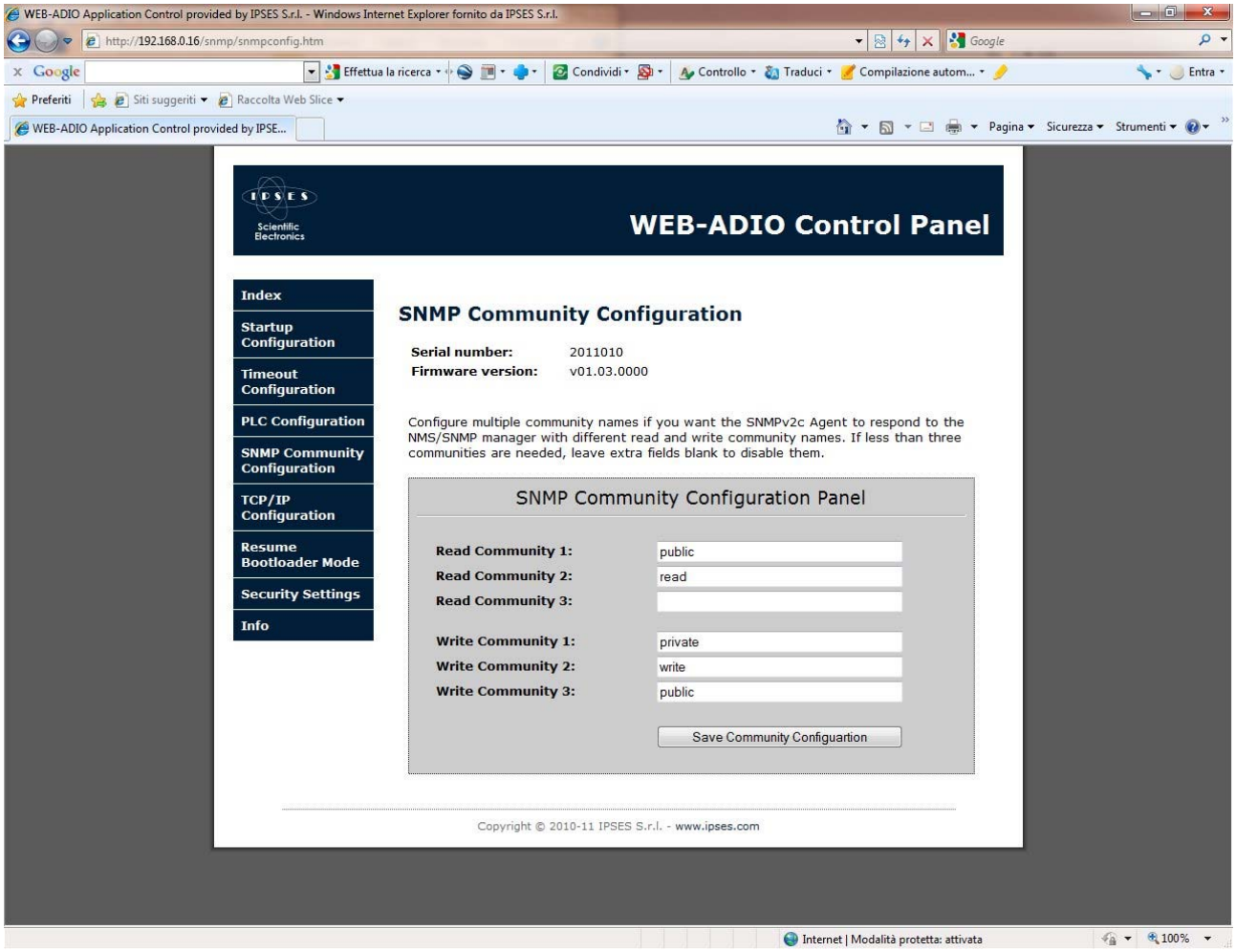
The *Disable All PLC Mask* button in the lower part of the PLC panel allows to reset and store the mask of each output, without modifying the filter settings.
If the freezing function for http page commands is enabled, both the buttons are disabled.
The *Timeout* function (previously described and shown in Picture 7) has priority over PLC function: if timeout occurs, all PLC enabled functions are temporarily disabled until the board will receive a new command or request.


WEB-ADIO Application Control provided by IPSES S.r.l. - Windows Internet Explorer fornito da IPSES S.r.l.
http://192.168.0.16/snmp/snmpconfig.htm
WEB-ADIO Control Panel
Index
Startup Configuration
Timeout Configuration
PLC Configuration
SNMP Community Configuration
TCP/IP Configuration
Resume Bootloader Mode
Security Settings
Info
SNMP Community Configuration
Serial number: 2011010
Firmware version: v01.03.0000
Configure multiple community names if you want the SNMPv2c Agent to respond to the NMS/SNMP manager with different read and write community names. If less than three communities are needed, leave extra fields blank to disable them.
SNMP Community Configuration Panel
Read Community 1: public
Read Community 2: read
Read Community 3:
Write Community 1: private
Write Community 2: write
Write Community 3: public
Save Community Configuartion
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Picture 9: SNMP Community configuration page.

The *SNMP Community Configuration* page, shown in Picture 9, allows to set the read and write communities for the SNMP server V2c.
Each community can be a case-sensitive alphanumeric string, with a maximum length of 8 characters. If you do not want to set one or more communities, leave the extra fields blank.
If all fields are left blank, it will be impossible to access to SNMP server.
The queries run in the MIB browser can be evaluated from the SNMP server only if the community with which the request is generated is included in the configuration list.
The button *Save Community Configuration* stores the settings on the board.
If the freezing function for http page commands is enabled, the button is disabled.

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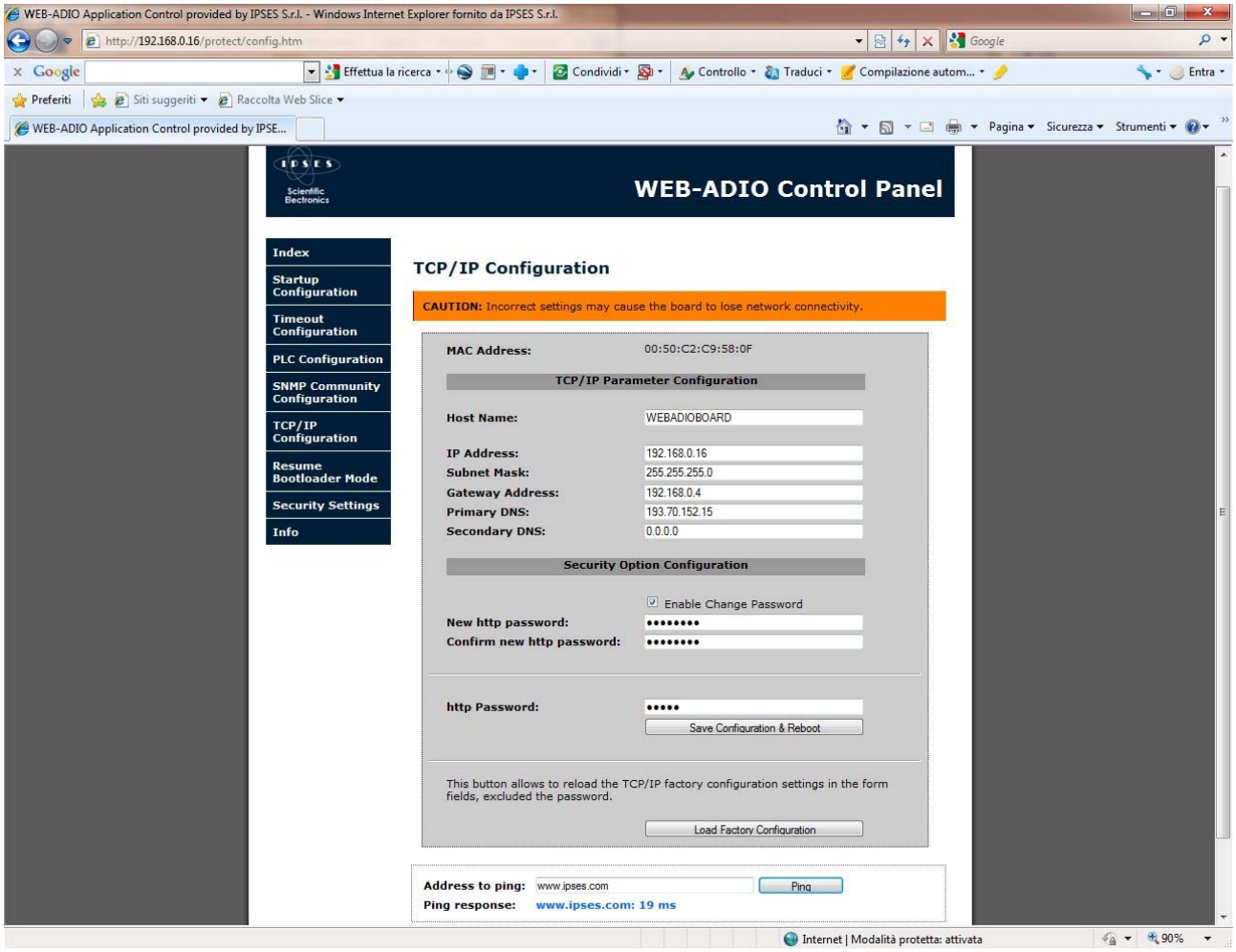

Picture 10: TCP/IP protocol and *http* password configuration page.

TCP/IP Configuration page, shown in Picture 10, allows to modify some TCP/IP protocol parameters and the *http* password of the board.
The hostname can be maximum 16 alphanumeric case-insensitive characters length.
To modify and save these parameters, it is necessary to insert a valid *http* password then press the *Save Configurations & Reboot* button. If the password is invalid or the data processing fails, the set parameters will not be saved and you will be redirect to an error page. To came back, click on the appropriate link.
The *Enable Change Password* checkbox allows to insert a new http password in the *New Password* and *Confirm New Password* fields.
The *Load Factory Configuration* button allows to restore factory parameters, excepted for the *http* password that will not be modified.
At the end of the page is available the Ping function which allows to verify the connection between card and inserted address. If the communication is lost, the ping section shows the following error message: "*Connection to WEB-ADIO board was lost*".

Warning: if the saved parameters are invalid or they could not be resolved in your network, you will lose the communication. To restore all default parameters, follow the procedure described in "ADDRESSES CONFIGURATION" paragraph.

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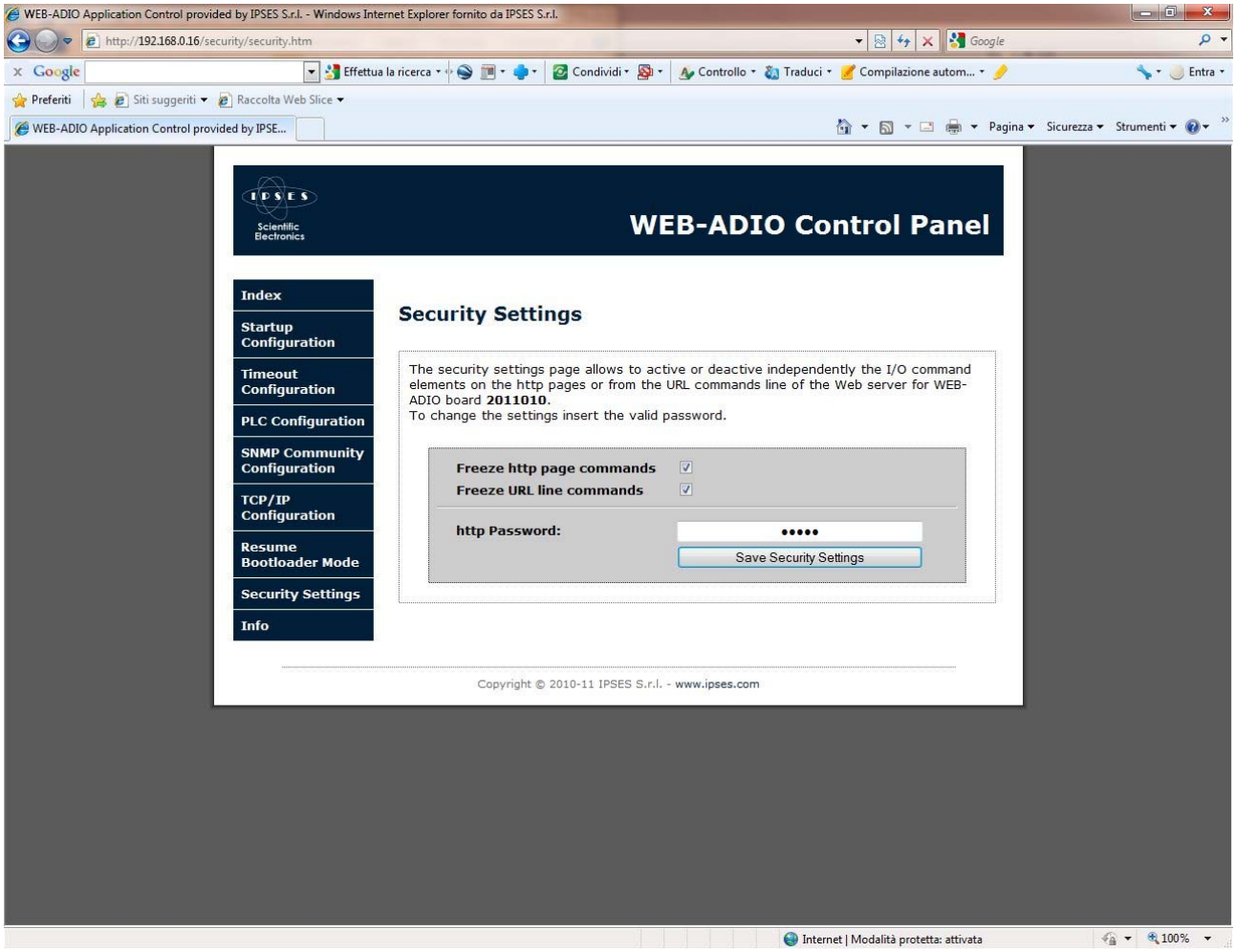
WEB-ADIO Application Control provided by IPSES S.r.l. - Windows Internet Explorer fornito da IPSES S.r.l.
http://192.168.0.16/security/security.htm
WEB-ADIO Control Panel
Index
Startup Configuration
Timeout Configuration
PLC Configuration
SNMP Community Configuration
TCP/IP Configuration
Resume Bootloader Mode
Security Settings
Info
Security Settings
The security settings page allows to active or deactive independently the I/O command elements on the http pages or from the URL commands line of the Web server for WEB-ADIO board 2011010.
To change the settings insert the valid password.
Freeze http page commands
Freeze URL line commands
http Password:
Save Security Settings
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Picture 11: Security settings configuration page.

The Security Settings configuration page, shown in Picture 11, allows to set the security levels, only for functions implemented on the http server. Its purpose is to inhibit the control of the board from unauthorized accesses.

There are 3 security levels:

- Level 0: security option is not enabled;
- Level 1: security on http pages;
- Level 2: security on URL commands, and automatically on http pages.

The security Level 0 allows to control the I/O status and functionality of the board, to anyone who enters the http pages or who knows the URL commands described in this manual.
To raise the security to the Level 1 is necessary to set the "*Freeze http page commands*" checkbox: the control buttons on the http pages will be disabled, but the URL commands will continue to be processed by card, as described next in the "I/O MANAGEMENT THROUGH http" paragraph.
To set Level 2 is sufficient to enable the "*Freeze URL line commands*" checkbox: the *Freeze http page commands*" checkbox will be automatically enabled and now both buttons on http pages than URL commands will be blocked from the board. However, the read I/O URL commands are processed.

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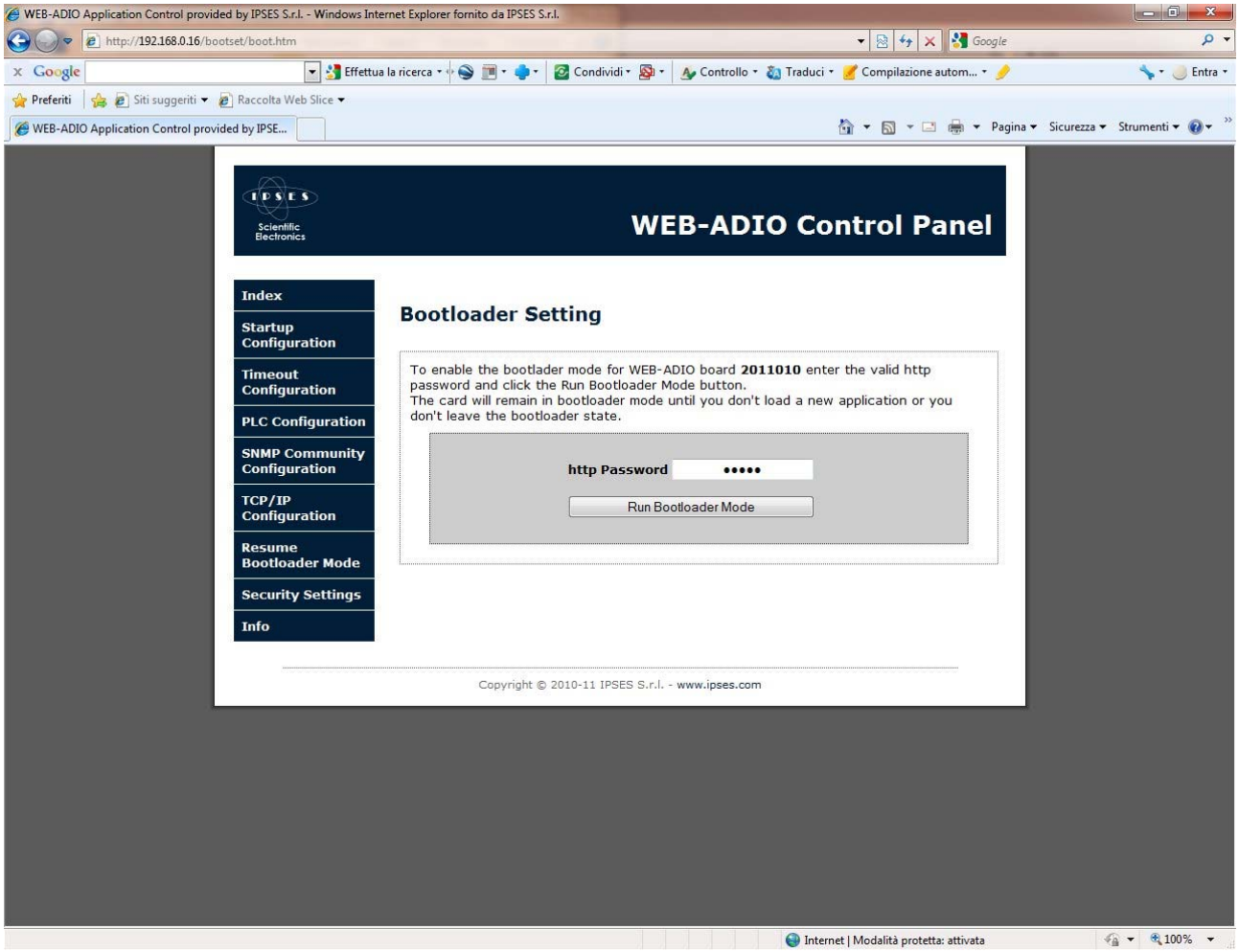
The reset of the board parameters resume the security Level 0.
The actual security settings are shown during the loading of the page. To save the new settings is mandatory to insert the correct http password before click the *Save Security Settings* button.


WEB-ADIO Application Control provided by IPSES S.r.l. - Windows Internet Explorer fornito da IPSES S.r.l.
http://192.168.0.16/bootset/boot.htm
WEB-ADIO Application Control provided by IPSE...
IPSES Scientific Electronics
WEB-ADIO Control Panel
Index
Startup Configuration
Timeout Configuration
PLC Configuration
SNMP Community Configuration
TCP/IP Configuration
Resume Bootloader Mode
Security Settings
Info
Bootloader Setting
To enable the bootlader mode for WEB-ADIO board 2011010 enter the valid http password and click the Run Bootloader Mode button.
The card will remain in bootloader mode until you don't load a new application or you don't leave the bootloader state.
http Password
Run Bootloader Mode
Copyright © 2010-11 IPSES S.r.l. - www.ipses.com
Internet | Modalità protetta: attivata
100%

Picture 12: Bootloader mode access page.

The *Bootloader Setting* page, shown in Picture 12, allows to run the bootloader mode on the board for a firmware upgrade. To enable this mode is mandatory to insert the correct http password before clicking on the *Run Bootloader Mode* button: so you will be redirect to the following network address: http://*current-ip*/bootloader (where *current-IP* is the current IP address of the board, i.e. 192.168.0.16).
Picture 13 shows the only page reachable in Bootloader mode. Until the board remain in this state, the SNMP server and the telnet server are unreachable, while all the outputs and *PLC* and *Timeout* function are disabled.

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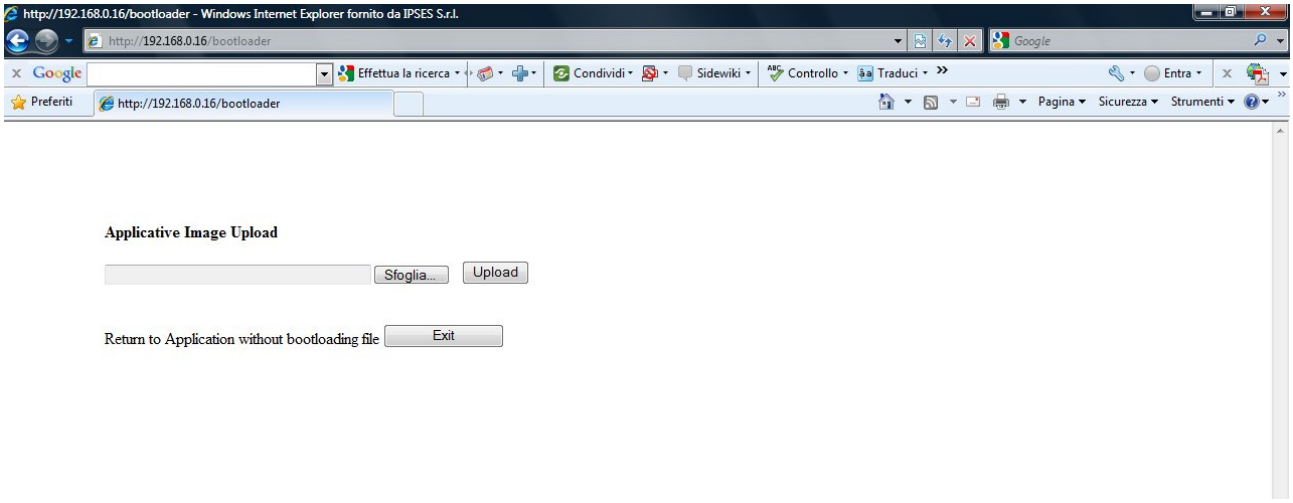

Picture 13: Firmware upgrade page.

The *Search* button allows to select the .bin file with the new firmware, and the *Upload* button starts the installation process. If the upgrade is completed successfully, the board will automatically return in Operative mode and you will be redirect to *index* page.
To exit the Bootloader mode with no upgrade, click the *Exit* button.

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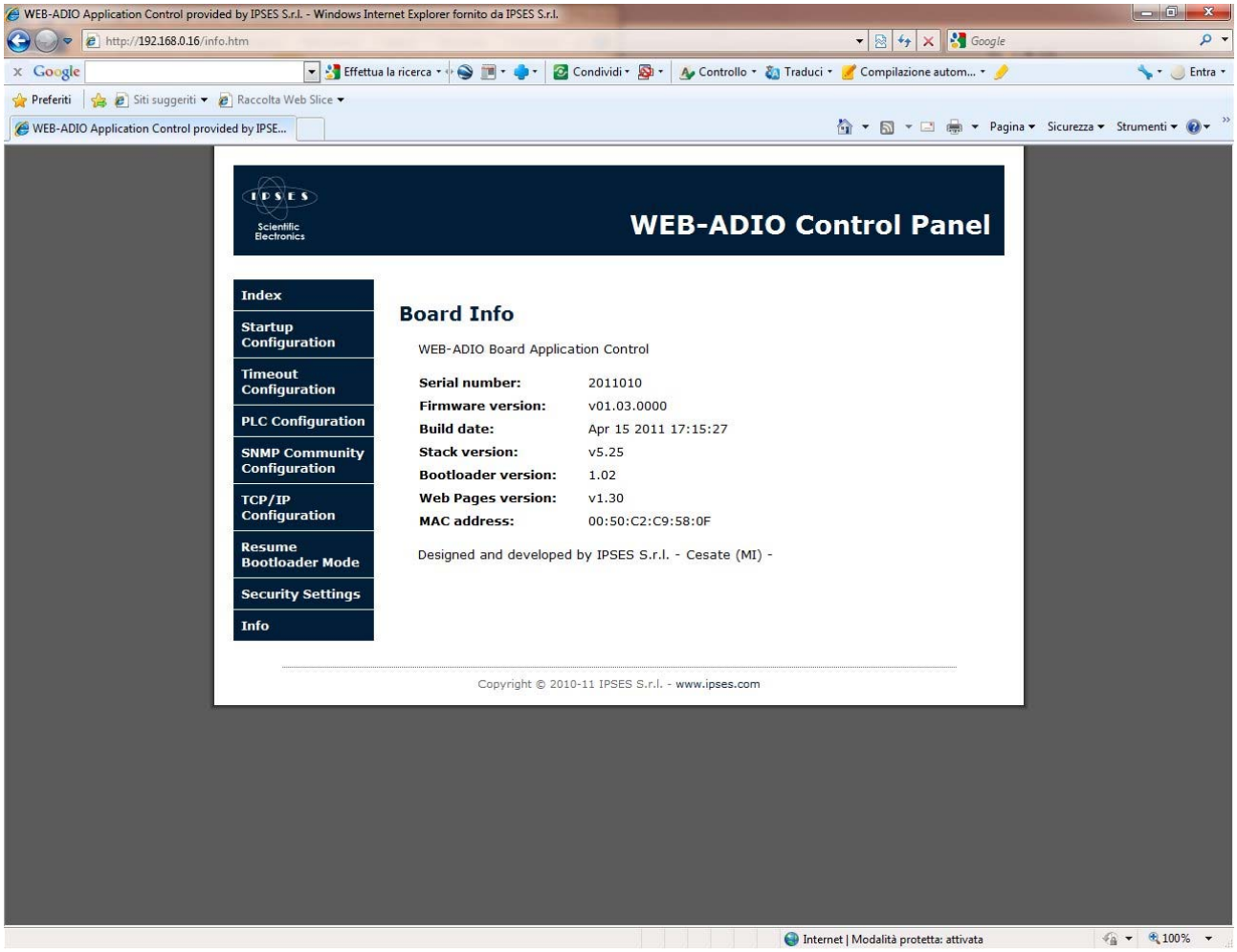

Picture 14: Firmware version information page.

The *Board Info* page, shown in Picture 14, lists the main information concerning firmware version running on the board.

I/O MANAGEMENT THROUGH http

The WEB-ADIO board can be interfaced to embedded system where should be useful to command or to read the digital and analogical I/O status through *http* protocol, without perform a parsing of the previous described web pages.

The I/O reading, both digital than analogical, can be performed by edit in the URL the following address: http://**current-ip/file**, where **current-ip** is the board address (i.e.: 192.168.0.16) and **file** is one among the following files:

- getdo.cgi read the digital output status in hexadecimal format (MSB is Out7 and LSB is Out0).
- getdi.cgi read the digital input status in hexadecimal format (MSB is In7 and LSB is In0).

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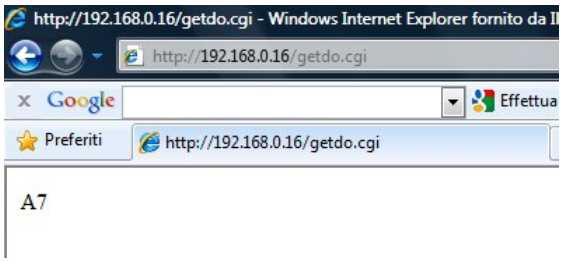
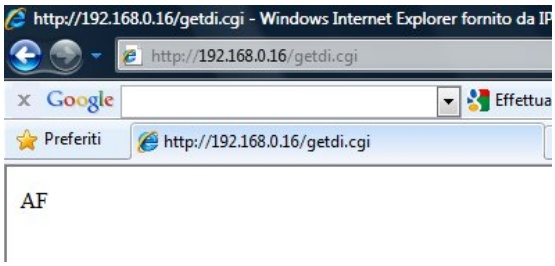
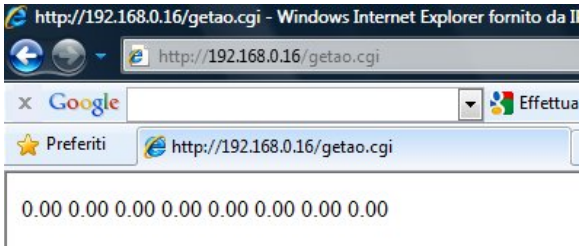
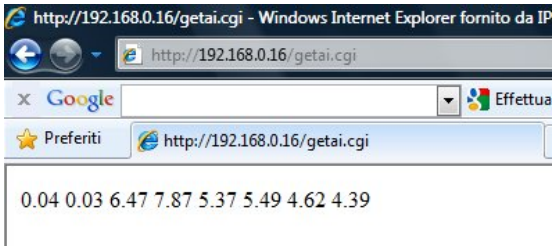
- getao.cgi read a series of eight strings, divided by \r char, each of them indicate the value of correspondent analogical output, start from Out0.
- getai.cgi read a series of eight strings, divided by \r char, each of them indicate the value of correspondent analogical input, start from In0.









To set a digital output edit in the URL the following address: http://**current-ip**/digbutton.cgi?dbtn=**x**, where **x** is referred to the digital output desired (0-7).
This command acts on the selected output by performing a change of its current status: it does not allows to select the logical level (high or low), but only to perform a toggle, unless the output is not tied to a logical level by the PLC function active.

To set an analogical output value edit in the URL the following address: http://**current-ip**/anbutton.cgi?abtn=o:**x**;v:**y**; where **x** is referred to the analogical output (0-7), and **y** is the value , in Volts, with the *vv.vv* format (i.e.: 10.00 or 2.53).

If the security option "*Freeze URL line commands*" is enabled, the command sent to the board is not processed.

The http page shown by the board as response to these commands is a blank page: the user must take care to digit correctly the URL addresses and the parameters.

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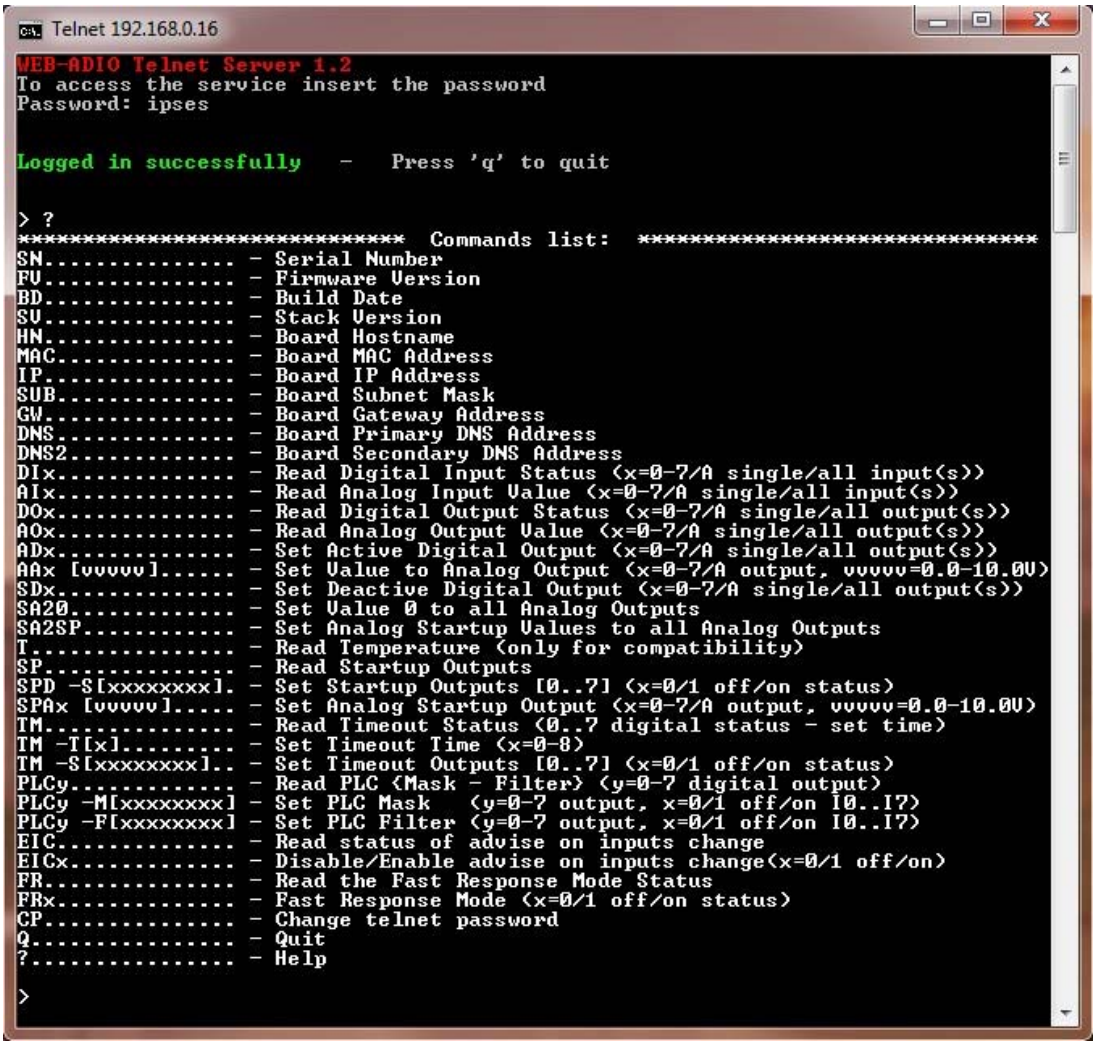
telnet SERVER

To connect to the *telnet* server implemented on the board it is enough a telnet client program (as the client installed in your operative system or the *hyperterminal*).
The configuration parameters of the client must be:

- telnet communication port: 23;
- echo: on (if you want to see typed characters);
- termination characters: <CR LF> (\r\n).

Picture 15 shows the initial snapshot: to access the server, insert the *telnet* password, then press “Enter”.


Telnet 192.168.0.16
WEB-ADIO Telnet Server 1.2
To access the service insert the password
Password: ipses
Logged in successfully - Press 'q' to quit
> ?
********** Commands list: **********
SN..... - Serial Number
FV..... - Firmware Version
BD..... - Build Date
SV..... - Stack Version
HN..... - Board Hostname
MAC..... - Board MAC Address
IP..... - Board IP Address
SUB..... - Board Subnet Mask
GW..... - Board Gateway Address
DNS..... - Board Primary DNS Address
DNS2..... - Board Secondary DNS Address
DIx..... - Read Digital Input Status (x=0-7/A single/all input(s))
AIx..... - Read Analog Input Value (x=0-7/A single/all input(s))
DOx..... - Read Digital Output Status (x=0-7/A single/all output(s))
AOx..... - Read Analog Output Value (x=0-7/A single/all output(s))
ADx..... - Set Active Digital Output (x=0-7/A single/all output(s))
AAx [vvvvv]..... - Set Value to Analog Output (x=0-7/A output, vvvvv=0.0-10.0V)
SDx..... - Set Deactive Digital Output (x=0-7/A single/all output(s))
SA20..... - Set Value 0 to all Analog Outputs
SA2SP..... - Set Analog Startup Values to all Analog Outputs
T..... - Read Temperature (only for compatibility)
SP..... - Read Startup Outputs
SPD -S[xxxxxxxx]. - Set Startup Outputs [0..7] (x=0/1 off/on status)
SPAx [vvvvv]..... - Set Analog Startup Output (x=0-7/A output, vvvvv=0.0-10.0V)
TM..... - Read Timeout Status (0..7 digital status - set time)
TM -I[x]..... - Set Timeout Time (x=0-8)
TM -S[xxxxxxxx].. - Set Timeout Outputs [0..7] (x=0/1 off/on status)
PLCy..... - Read PLC (Mask - Filter) (y=0-7 digital output)
PLCy -M[xxxxxxxx] - Set PLC Mask (y=0-7 output, x=0/1 off/on I0..I7)
PLCy -F[xxxxxxxx] - Set PLC Filter (y=0-7 output, x=0/1 off/on I0..I7)
EIC..... - Read status of advise on inputs change
EICx..... - Disable/Enable advise on inputs change(x=0/1 off/on)
FR..... - Read the Fast Response Mode Status
FRx..... - Fast Response Mode (x=0/1 off/on status)
CP..... - Change telnet password
Q..... - Quit
?..... - Help
>

Picture 15: *telnet* server access page and help request.

This service allows to read analogical and digital I/O status, to read card parameters and to control outputs. All commands are case-insensitive.

Commands list:

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Command	Description	Answer type
Q	Closes telnet connection	
SN	Requests board serial number	1
FV	Requests firmware version	1
BD	Requests firmware build date	1
SV	Requests TCP/IP stack version	1
HN	Requests board hostname	1
MAC	Requests board MAC address	1
IP	Requests board IP address	1
SUB	Requests board Subnet mask	1
GW	Requests board Gateway address	1
DNS	Requests board Primary DNS server address	1
DNS2	Requests board Secondary DNS server address	1
DIx	Requests digital input status (x = 0-7 / A → all)	2
DOx	Requests digital output status (x = 0-7 / A → all)	2
AIx	Requests analogical input status (x = 0-7 / A → all)	2, 3
AOx	Requests analogical output status (x = 0-7 / A → all)	2, 3
ADx	Actives related digital output (x = 0-7 / A → all)	4
SDx	Disables related digital output (x = 0-7 / A → all)	4
AAx [vvvvv]	Sets analogical output x (x = 0-7 / A → all) with a value vvvvv included in the 0.00V-10.00V range	4
SA20	Sets all analogical output with a 0.00V value	4
SA2SP	Sets all analogical output with their startup value	4
SP	Requests all startup outputs status	2, 3
SPD –S[xxxxxxxx]	Sets startup status (x = 0/1 – Off/On) of each digital output, from Out0 to Out7	4
SPAx [vvvvv]	Sets startup status of analogical output x (x = 0-7 / A → all) with a value vvvvv (0.00V-10.00V range)	4
TM	Requests timeout settings (digital outputs status Out0..Out7 – timeout time [0-8])	1
TM –T[x]	Sets timeout time (x = 0-8)	4
TM –S[xxxxxxxx]	Sets timeout status (x = 0/1 – Off/On) of each digital output, from Out0 to Out7	4
PLCy	Requests mask and filter settings (M0..M7 – F0..F7 related to In0..In7 digital inputs) for the y digital output (y = 0-7)	1
PLCy –M[xxxxxxxx]	Sets the mask status (x = 0/1 – Off/On) of each digital input, from In0 to In7, for the y digital output (y = 0-7)	4
PLCy –F[xxxxxxxx]	Sets the filter status (x = 0/1 – Off/On) of each digital input, from In0 to In7, for the y digital output (y = 0-7)	4
EIC	Requests the operating status of the notification of change of inputs (acts only for digital inputs)	5
EICx	Enable/Disable the notification function of change of digital inputs (x= 0/1 – Off/On)	4
FR	Requests Fast Response status (0/1 = Off/On)	5
FRx	Set Fast Response status (x=0/1 – Off/On)	4
CP	Enables telnet service password	
?	Command help	

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The change of the password in telnet does not perform a reboot of the board or the automatic disconnection from the current session, on the contrary to what happens in the analogous http service. Obviously, next telnet access to board, here included the use of demo software, must be authorized by the new password.
The typing of an excessive number of chars (over 29) saturates the receiving buffer of the card and consequently the session will be lost.

The following table lists the kind of answer related to the edited command:

Answer type	Description
1	The answer is preceded by a 18 chars length descriptive string. For example the SN command generates the following answer: "Serial number: 2010000".
2	The answer is preceded by a descriptive string with variable length, related to the typed command.
3	The answer is divided in several row.
4	The answer to these I/O setting commands is: "\x1b[34done \x1b[0;1m".
5	The answer is made by a single char: 0 = Off, 1 = On.

The next table encode the timeout time parameter used in TM and TM –T[x] commands:

Parameter	Value
0	No timeout
1	5 seconds
2	10 seconds
3	30 seconds
4	1 minute
5	5 minutes
6	10 minutes
7	30 minutes
8	1 hour

DEVELOPMENT OF CONTROL APPLICATIONS WITH *telnet* PROTOCOL

It is possible to develop a control application for the WEB-ADIO board based on telnet Server: the user program should be able to manage the strings generated from the server.
The following are the strings used in the program, with a brief description of them.

Server telnet access string.
"\x1b[2J\x1b[31m\x1b[1mWEB-ADIO Telnet Server 1.2\x1b[0m\r\nTo access the service insert the password \r\nPassword: "

Answer string to incorrect password: the telnet socket will be closed.
"\r\nAccess denied\r\n\r\n"

Answer string to correct password: the command prompt will be shown.
"\r\n\r\n\x1b[1;32mLogged in successfully\x1b[0m - Press 'q' to quit\r\n\r\n"

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Command prompt: it is shown after each command executed, except CP command.
"\r\n> "

Answer string to each invalid command or request
"\x1b[33merror\x1b[0;1m"

UTILITY DESCRIPTION

The EICx (Advise on Input Change) command allows to enable or disable the printing of the status of all digital inputs, in hexadecimal format, every time there is a change of almost one digital input.
The command is disabled by default at every server access.

The FRx (Fast Response) command allows to enable or disable the printing of the descriptive strings. This utility is useful to write codes in which the program focus his resource only to process the data received in a synthetic form, without parsing all the strings.
The command is disabled by default at every server access.

The CP (Change Password) command is made by three phases: in the first it is requests to insert the new password:
"\r\nEnter new password: "
Next is request to confirm the new password:
"\r\nConfirm new password: "
Now, if the passwords match is valid, the answer string will be:
"\r\n\r\nPassword changed successfully!\r\n"
Otherwise it will be:
"\r\n\r\nPassword change fails!\r\n"
The change of the password in telnet does not perform a reboot of the board or the automatic disconnection from the current session, on the contrary to what happens in the analogous http service. Obviously, next telnet access to board, here included the use of demo software, must be authorized by the new password.

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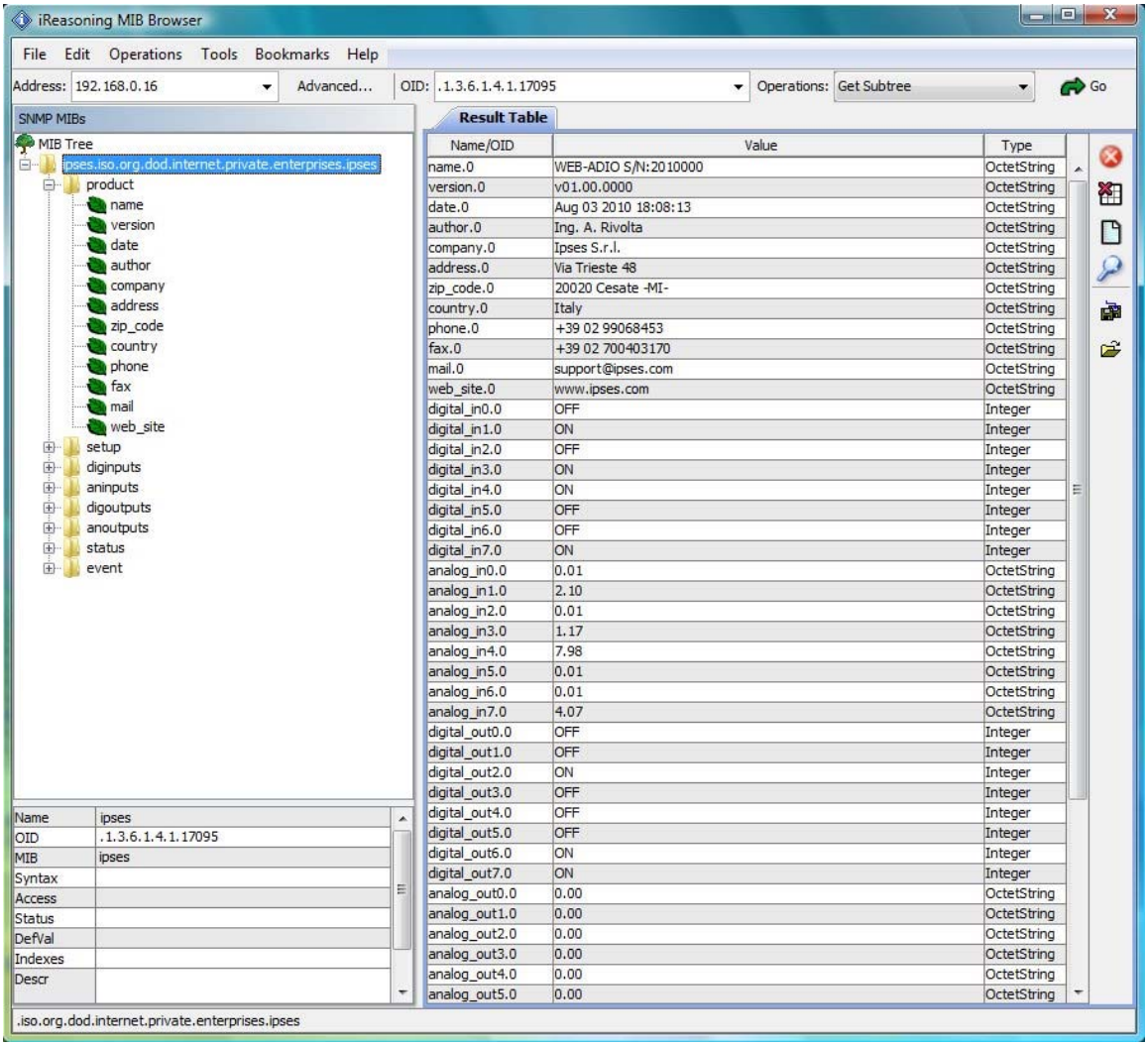
SNMP SERVER

To connect the SNMP server implemented on the board it is possible to use any MIB browser program, like *iReasoning MIB Browser*[2].
After starting the communication with the board it is necessary to be sure the browser is correctly configured, with the following check list.

- The MIB Tree must include the .mib file provided with the CD. To load it, use the command "File → Load MIBs" and search through the folders, selecting the file *webadio.mib*.
- The Agent must be configured properly with communities parameters. To verify it, use the command "Tools → Options" and select the tab Agents. The *Add button* allows to configure a new Agent, setting IP board address, Port (161), Version (2), Read and Write Communities.



[2] Downloadable from www.ireasoning.com web site

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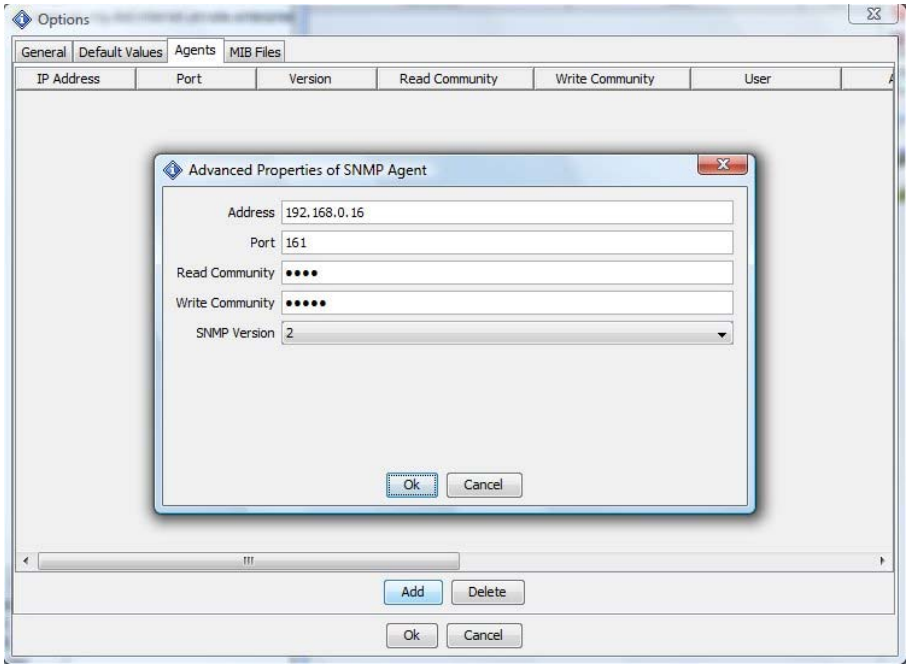

Picture 16: MIB browser and SNMP Agent configuration.

Picture 16 shows the MIB browser and the configuration of the SNMP Agent parameters.
The MIB Tree has eight branches, each of them has several leafs:

- *product*, where to read information about the board
- *setup*, where to set the parameters for two different traps
- *diginputs*, where to read digital input status
- *aninputs,* where to read analogical input values
- *digoutputs*, where to read or set the digital output status
- *anoutputs,* where to read or set the analogical output value
- *status*, where to read the PLC and Timeout function status (On/Off)
- *events*, which is the container of the variable associated to the Trap's event, and it can be read or write.

Using SNMP server is not possible to configure the PLC and Timeout functions.

The *Operations* selector specifies the request to be sent to the server. The answers to reading requests are shown in the Result Table; instead, to set a parameter, is mandatory to insert the value, according to the kind specified, in the relevant form of the pop-up window.
For further information about commands and functions, consult your browser helper.

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TRAP EVENTS

The SNMP server implemented on WEB-ADIO board can generate two separate Trap events, both of them associated to a change of digital inputs status. Each event can be configured independently.
The Traps generated are compliant to v2c protocol specification and the information is stored in a sequence of two varbinds as 8 bit format: the first one encoding the digital input status (In0 – In7), the second one encoding the digital output status (Out0 – Out7).

The parameters to configure, for each event, are:

- trapEnable: 0/1 respectively to disable/enable the event notify.
- trapReceiverIPAdrress: IP address of the receiver machine (i.e. the IP address of your PC).
- trapCommunity: a valid community name to receive the event notify.

By default, the parameters of the Trap events are reset at every rebooting: to avoid this condition set the *save_option* variable in the *setup* path before to configure the parameters values. If the save_option variable is deactivated at the startup, the parameters are resetted.

To see in your mib browser the list of the events generated, is necessary to open the *Trap Receiver* window with the "Tools → Trap Receiver" command.

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PROBLEMS RESOLUTION:

The next section lists some procedure steps to investigate board malfunctions. If the problem will be not solved, contact the technical support of IPSES S.r.l. sending the Engineering Problem Report included in this manual or downloadable from IPSES website at the following address *http://www.ipses.com/PDF/IPSES-engineering_problem_report.pdf*

- Verify the correct power supply and operation of the board (see status LEDs).
- Verify the correct connection of the network cable both on board and LAN side (network card, switch …) and if the board is visible from the network.
- Verify the compatibility of board addresses (IP, subnet, gateway) in the operative network. If there is no compatibility, ensure to configure them properly.
- Try to ping the IP address of the board.
- Make sure the IP address in the URL field is correct (*http* service).
- Verify there are no more than 5 simultaneous connection opened on the same board (*http* service).
- Make sure the password inserted in the TCP/IP Configuration page is correct (*http* service).
- Make sure the *telnet* communication port is number 23 (*telnet* service).
- Make sure the *telnet* access password is correct: it is case sensitive (*telnet* service).
- Verify there is no telnet communication already active on the board, via telnet client or demo software (*telnet* service).
- Verify the DNS server addresses correctness for the ping query.
- Verify the address entered with the ping function (*http* service).
- Check the MIB browser is set properly through the .mib correct file loading and communities settings (SNMP service).

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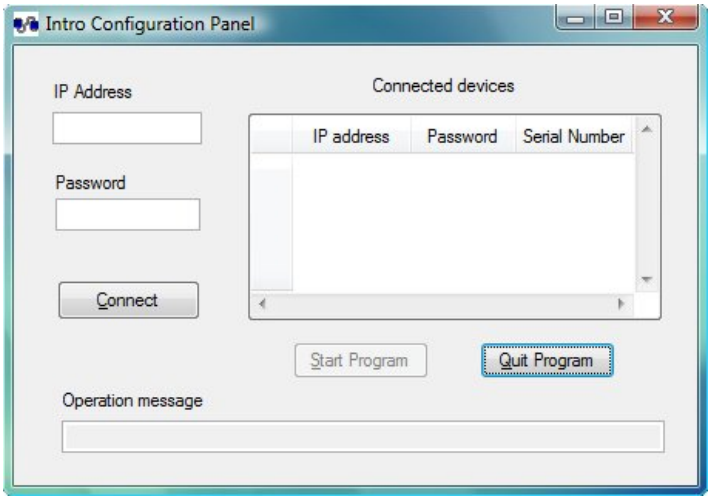
DEMO SOFTWARE

A CD with a demo software is provided with the card. This demo software for Windows O.S., based on *telnet* service, allows to manage the main functions of WEB-ADIO. To use this software, it is necessary a telnet communication is not already opened on the card, while a *http* communication service can exist simultaneously with. This software allows to manage up to 100 WEB-ADIO devices simultaneously connected to an Ethernet network.

At the software start-up, the program shows a windows (Picture 17) where it is possible to initialize the devices connection to be managed through the software. To open the connection with a card, insert its *IP address* and its *telnet Password* in the relevant fields, then click on the *Connect* button. After few seconds, if the connection will be successfully opened, the *IP address*, *password* and *serial number* parameters of the board will be shown on *Connected devices* table; otherwise an error message will be shown in the *Operation message* indicator. The *Start Program* button will be enabled only when the connected device list will contain almost one connected device. It is no possible to add other devices once the initialization phase is terminated: to do this, close the program and restart it repeating the initialization steps.
The *Quit Program* button allows to close the software without opening the main window.



Picture 17: Initialization connection panel of the demo software.

In Picture 18a there is a snapshot of the main window of the software. To enable the control of one of the initialized cards it necessary to select its *Serial Number* from the *Device S/N* ring menu. The selection of a new board allows to automatically update the inputs and outputs status and to update *Firmware Version* and *IP Address* fields. The temperature indicator is updated only if the card is equipped with the relevant sensor; otherwise the indicator will be disabled.

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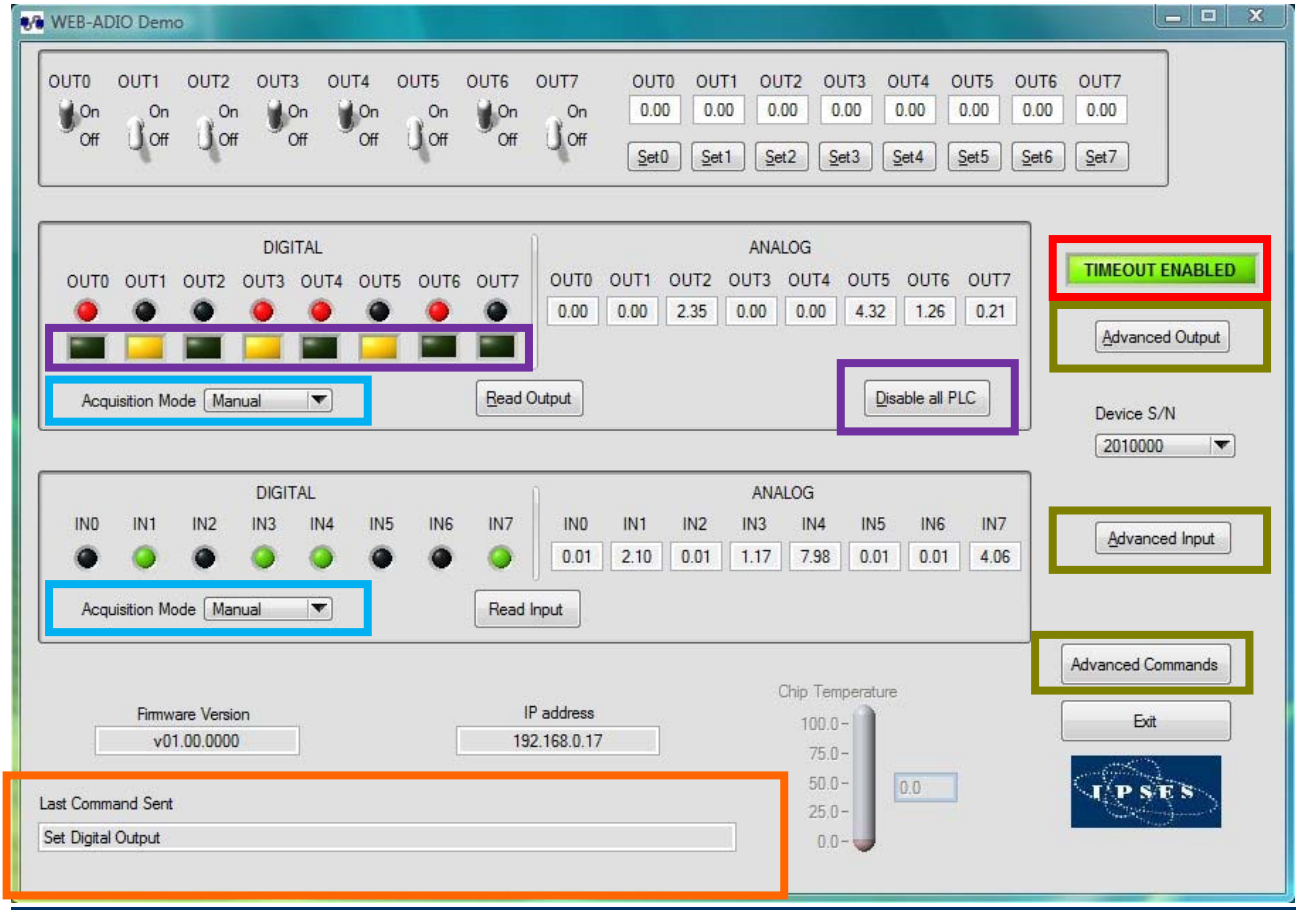

Picture 18a: Main windows of the demo software.

The field *Last Command Sent* (surrounded in orange in Picture 18a) shows the last executed operation.
In the upper section of the window there are the selectors and the controls to drive directly in real time the digital and analogical outputs.

while the *Read Output* button update the software output LEDs exactly as in the card (the software colour, red, is the same of the card).
Both logic inputs and outputs status can be achieved by two ways, thanks to the selectors ring menu (surrounded in blue in Picture 18a): the manual mode performs an asynchronous acquisition when you push respectively the *Read Input* button or *Read Output* button, while the automatic mode performs a continuous polling of the inputs and/or outputs state. The polling rate are customizable by the *Polling Time* controls (showed in Picture 18b): these fields accept values between 1.5s and 10s, with a step of 0.5s. In both cases, the relevant virtual indicators are updated at every acquisition: the software LEDs, with red colour for outputs and green colour for inputs, are associated to digital channels, while text indicators are associated to analogical channels.

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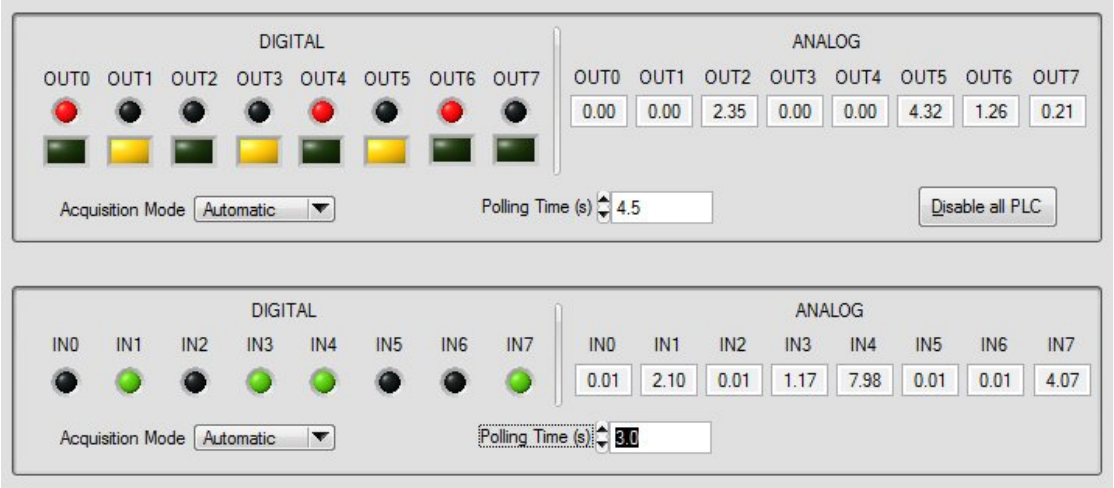
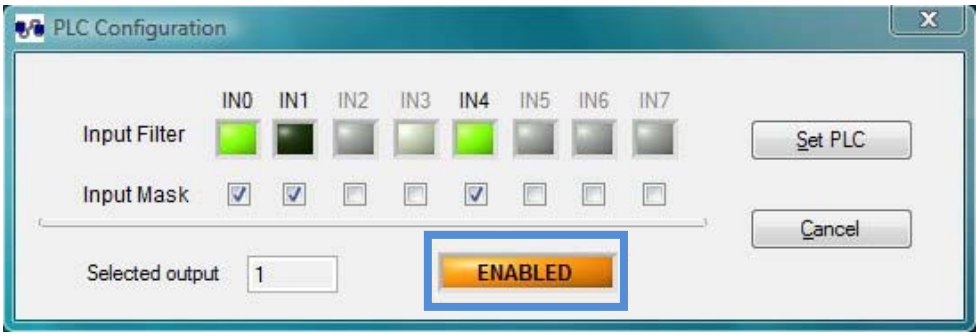

DIGITAL
OUT0 OUT1 OUT2 OUT3 OUT4 OUT5 OUT6 OUT7
ANALOG
OUT0 OUT1 OUT2 OUT3 OUT4 OUT5 OUT6 OUT7
0.00 0.00 2.35 0.00 0.00 4.32 1.26 0.21
Acquisition Mode Automatic
Polling Time (s) 4.5
Disable all PLC
DIGITAL
IN0 IN1 IN2 IN3 IN4 IN5 IN6 IN7
ANALOG
IN0 IN1 IN2 IN3 IN4 IN5 IN6 IN7
0.01 2.10 0.01 1.17 7.98 0.01 0.01 4.07
Acquisition Mode Automatic
Polling Time (s) 3.0

Picture 18b: Automatic acquisition mode of the inputs and the outputs.

The objects in the purple section (see Picture 18a) allow to configure the masks and filters for PLC functions. Clicking on square LED referred to an output will appear a pop-up window, as shown in Picture 19.
For each output the square LED is on only when almost an input is masked, so the PLC function is enabled, otherwise it is off and the PLC function is disabled.
The *Disable all PLC* button resets and stores all masks for each output, without modifying any filter.



Picture 19: mask and filter PLC configuration pop-up window.

At the pop-up window loading, the mask and filter configuration currently stored for the selected output is shown.
If a mask of an input is enabled, it is possible to modify its filter status too, otherwise the last one is dimmed. To modify a filter status, click on the relative square LED.
If all inputs are not masked, the notify square LED, surrounded in blue in Picture 18, is off and the "DISABLED" message appears.
The *Set PLC* button allows to store the configuration settings, while the *Cancel* button close the pop-up window without saving them.
The square LED surrounded in red in Picture 18a shows the status of the Timeout function. If it is disabled, the LED is off and appear the TIMEOUT DISABLED message.

Three buttons on the right (surrounded in green in Picture 18a) allow to open three windows: one for the outputs (*Advanced Output)*, one for the inputs (*Advanced Input)* and the last one for the read and write commands in the non volatile memory (*Advanced Commands*).

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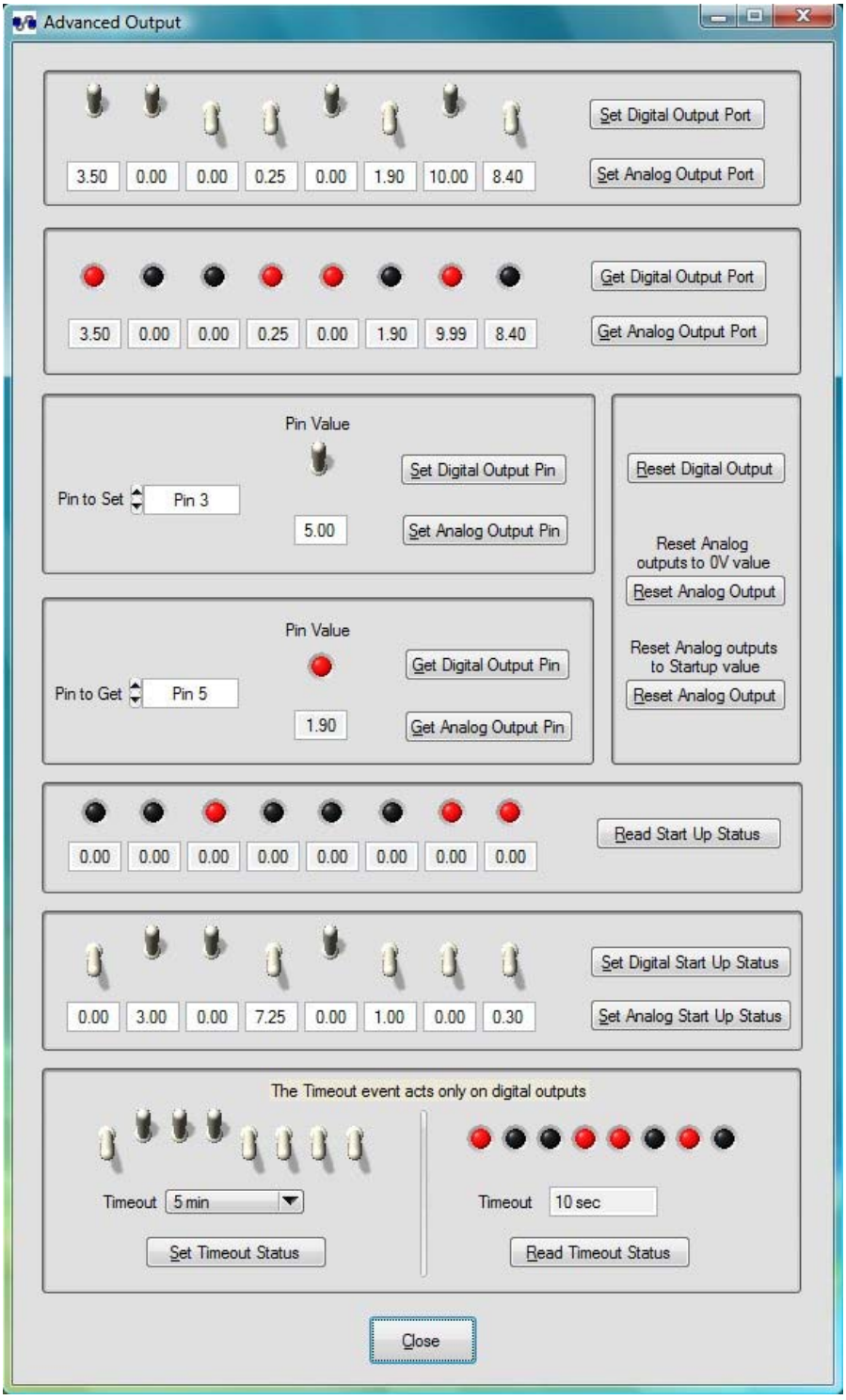
The *Advanced Output* window (see Picture 20) allows the typical operations you can perform on the outputs of the device.



Picture 20: Advanced Output window.

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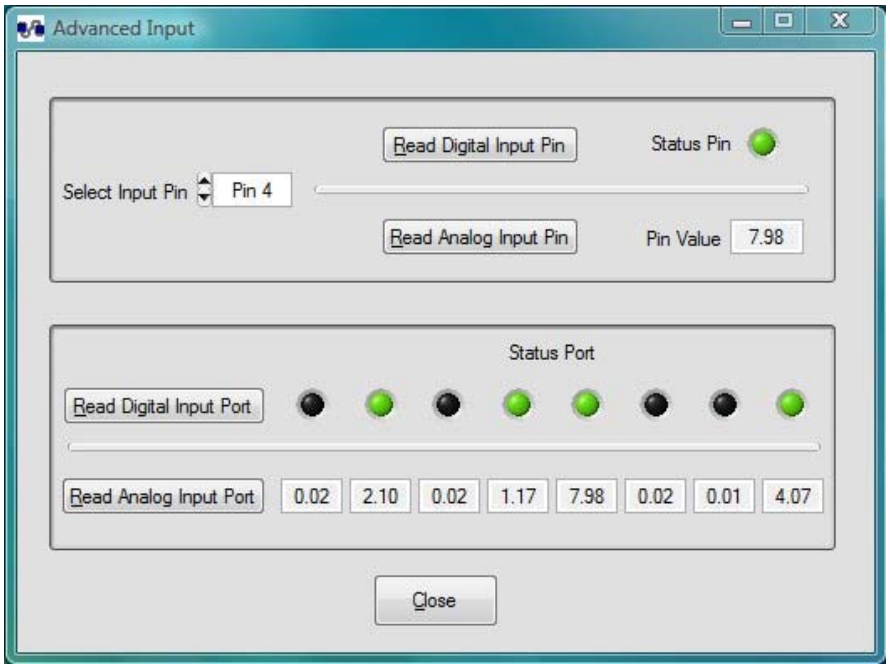
The output commands are listed below:

- Activation/Deactivation of each output for the digital channel
- Settings of the voltage level of each outputs for the analogical channel
- Reading of the status of each output for digital channel
- Reading of the set value of each output for analogical channel
- Setting and reading of a single output for both channels
- Reset of the digital outputs (all outputs are switched off)
- Reset of the analogical outputs (they can be set to 0V or assume the start-up configuration)
- Reading of the start-up configuration for both channels
- Setting of the start-up configuration for digital and/or analogical channel
- Reading of the Timeout function configuration (digital outputs status and timeout time)
- Settings of the Timeout function configuration (digital outputs status and timeout time)

Advanced Input window (see Picture 21) allows the typical operations you can performed on the inputs of the device.
The input commands are listed below:

- Reading of the status/value of each input for the digital/analogical channel
- Reading of the status/value of a single input for the digital/analogical channel



Picture 21: Advanced Input window.

The *Advanced Commands* window (see Picture 22) displays all TCP/IP and firmware configuration parameters of the current board and allows to change the *telnet* password.
The new *telnet* password must be inserted in the *New Password* field and replied in *Confirm New Password* field: it could be any alphanumeric strings with a valid length which is included between one and eight characters.

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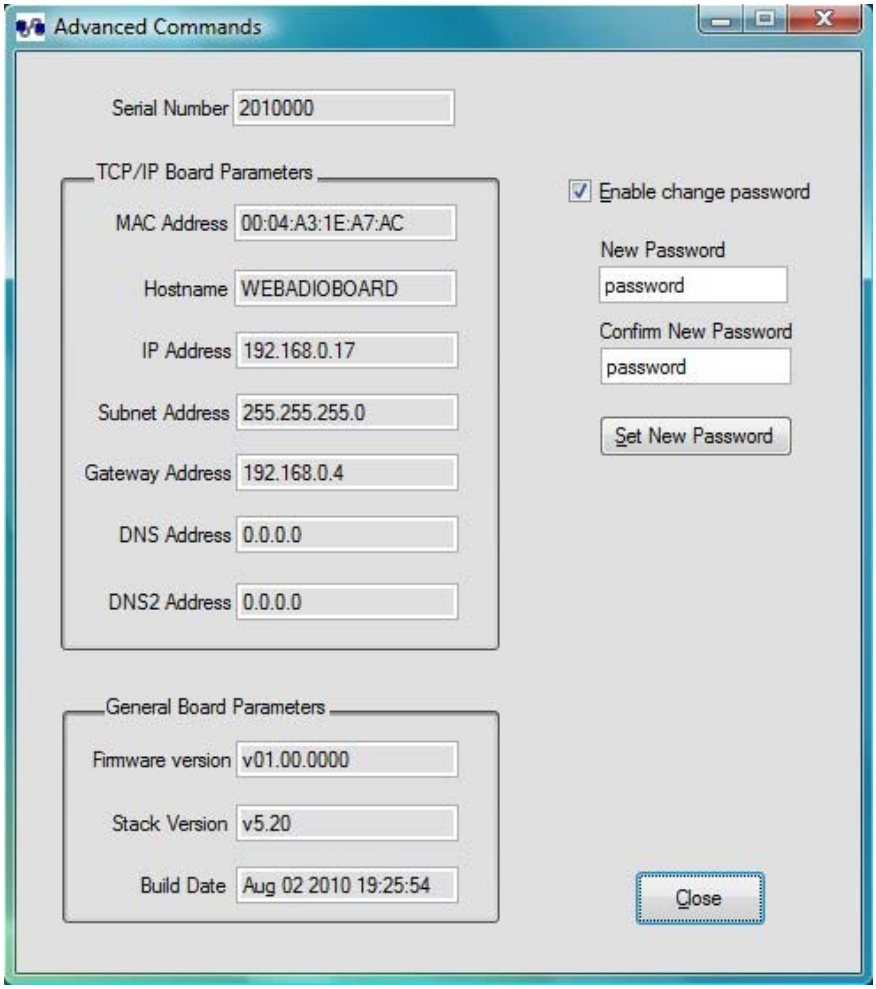
The *Enable Change Password* checkbox enables the *Set New Password* button. The result of the modifying command will be shown in the *Last Command Sent* field in the lower part of the main panel, while if an error is generated by the password validity check operation, the error message will be popped up.



Picture 22: Advanced Command window.

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TCP/IP ADDRESS CONFIGURATOR SOFTWARE

WEB-IO Board Address Configurator, provided with the card, is a software which allows to configure remotely TCP/IP addresses for WEB family IO control units (WEB-IO, WEB-ADIO, WEB-IO-WiFi, WEB-ADIO-WiFi).
Only for WiFi models it is also possible to configure the wireless board parameters.
The configuration of the device is achieved through Ethernet interface, or, only for WiFi models, also with the wireless interface. In the last case it is necessary that the card can connects itself to the Access Point, i.e. the SSID and authentication parameters must be correct.
To work properly, only one card per time must be set in address configuration mode, even if you have more than one board of the WEB family connected.
WEB-IO Board Address Configurator software is able to communicate with every IP address, excluded the reserved broadcast address (255.255.255.255). That means it is possible to configure also cards with out-of-net IP addresses.

ADDRESS CONFIGURATION MODE

To enable the hardware *address configuration* mode, follow the procedure listed below:

- with the WEB-ADIO board already powered on, insert jumper J2 (see picture below).
- perform the desired software configuration.
- at the end of the configuration, remove jumper J2.

Do not disconnect the power supply during the address configuration procedure.
A supply reset, with the jumper J2 inserted, will restore the factory parameters.

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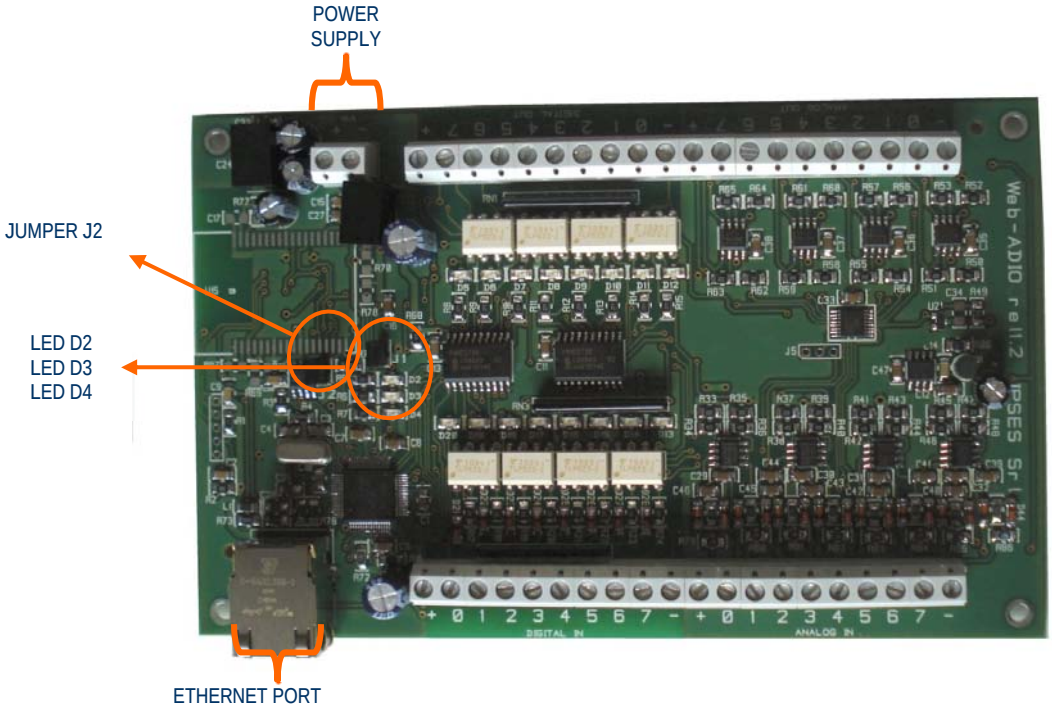

Picture 23: WEB-ADIO card

ADDRESS CONFIGURATOR CONTROL PANEL

The *WEB-IO Board Address Configurator* control panel, shown in Picture 24, allows to configure both TCP/IP parameters, like IP address, Subnet mask address, Gateway address and Primary and Secondary DNS server addresses, than wireless parameters to connect to the Access Point. The modification of these last ones can be enabled by the user, after a WiFi model card was previously selected.
Before to set the new parameters, the user should properly select the target card through the *Select Target Board* ring: the wireless parameters will be enabled or disabled, based on selected model.
Every field is saved on the board: it is important to compile each field with correct values.
The *Reboot enable* checkbox allows to perform a software rebooting of the card after the address configuration is successfully ended.
If the configuration process ends successfully, the status LEDs D2 and D3 on the board will flash for about one second.

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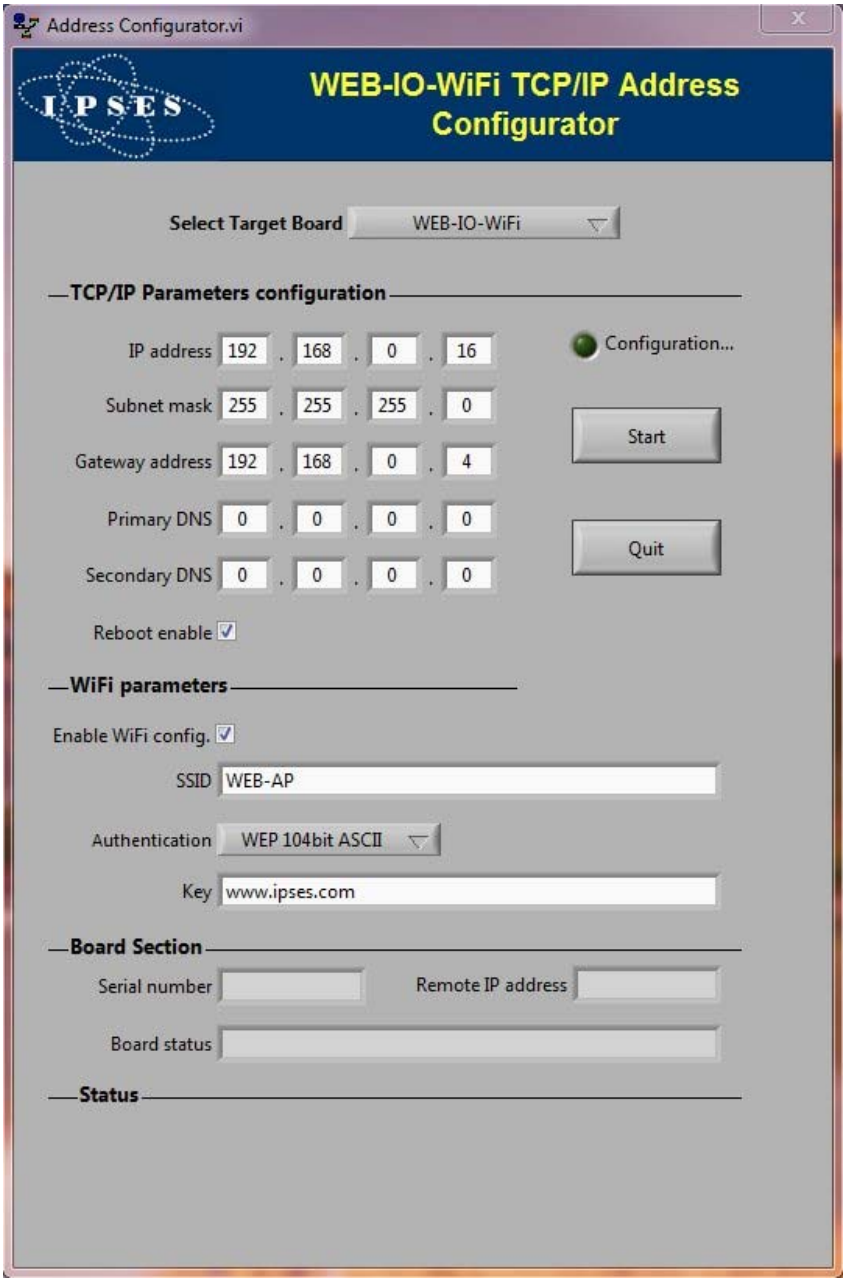

Picture 24: WEB-IO Address Configurator software control panel

To send the new TCP/IP address configuration, click the *Start* button; during the communication with the card the *Configuration* LED is on.
To exit the software, click on *Quit* button.
If the communication handshake to the card has success, the *Serial number* and *Remote IP address* fields in the *Board Section* are filled respectively with the current S/N and IP address of the card, as shown in Picture 25.
The Board status field shows a message about the progress of the configuration status.

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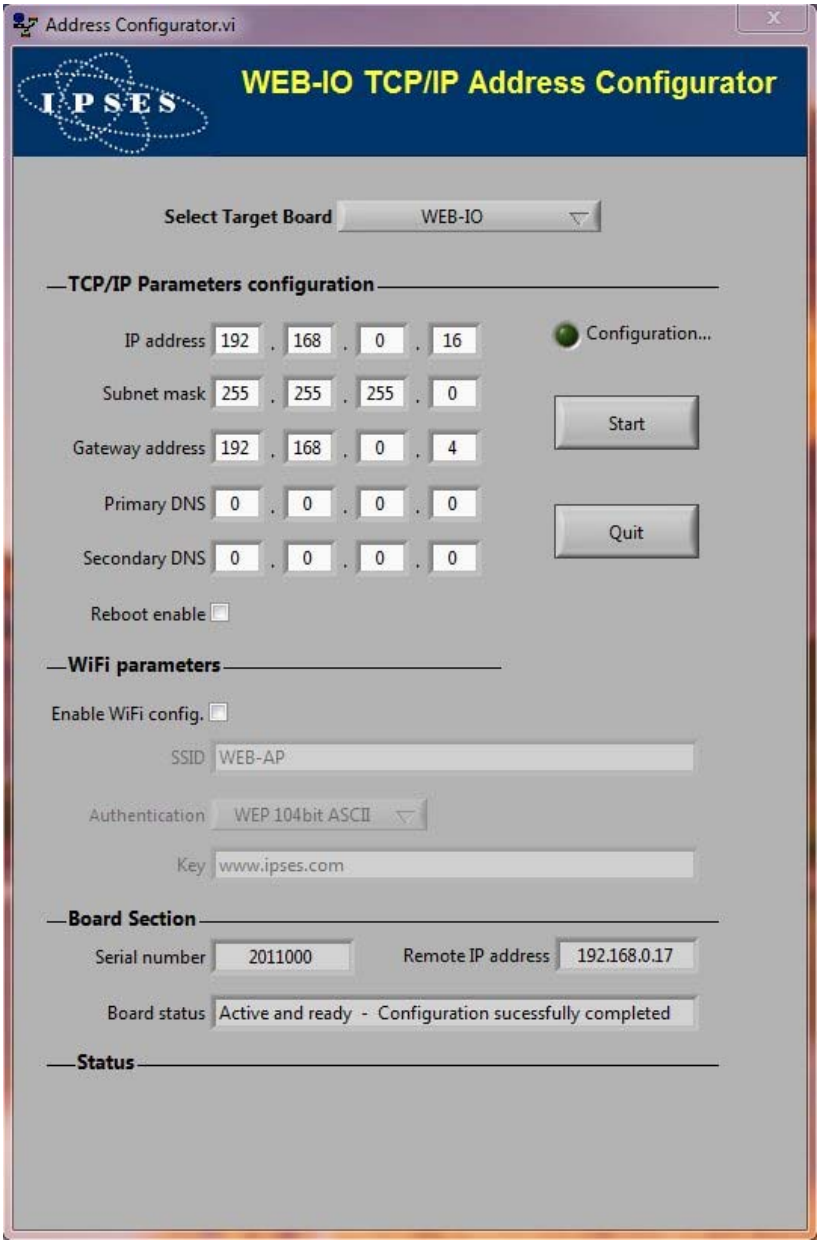
Address Configurator.vi
WEB-IO TCP/IP Address Configurator
Select Target Board
WEB-IO
TCP/IP Parameters configuration
IP address 192 . 168 . 0 . 16
Subnet mask 255 . 255 . 255 . 0
Gateway address 192 . 168 . 0 . 4
Primary DNS 0 . 0 . 0 . 0
Secondary DNS 0 . 0 . 0 . 0
Reboot enable
Configuration...
Start
Quit
WiFi parameters
Enable WiFi config.
SSID WEB-AP
Authentication WEP 104bit ASCII
Key www.ipses.com
Board Section
Serial number 2011000
Remote IP address 192.168.0.17
Board status Active and ready - Configuration sucessfully completed
Status

Picture 25: Configuration successfully completed.

If a communication error occurs, the *Serial number* field is empty and the *Remote IP address* field shows an invalid IP address (0.0.0.0), while an error message is shown in the *Status* section and the *Start* and *Quit* buttons are disabled until the error is reset, as shown in Picture 26.

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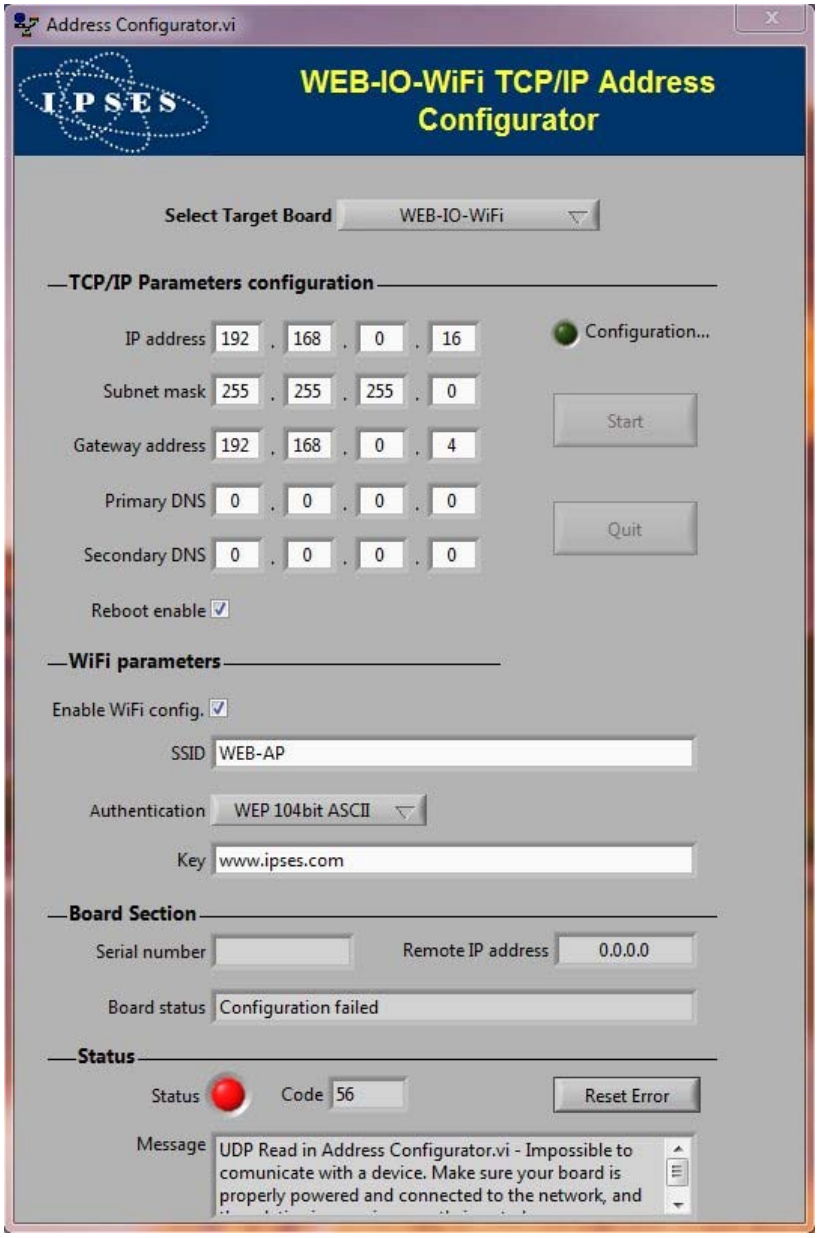
Address Configurator.vi
WEB-IO-WiFi TCP/IP Address Configurator
Select Target Board
WEB-IO-WiFi
TCP/IP Parameters configuration
IP address 192 . 168 . 0 . 16
Subnet mask 255 . 255 . 255 . 0
Gateway address 192 . 168 . 0 . 4
Primary DNS 0 . 0 . 0 . 0
Secondary DNS 0 . 0 . 0 . 0
Reboot enable
Configuration...
Start
Quit
WiFi parameters
Enable WiFi config.
SSID WEB-AP
Authentication WEP 104bit ASCII
Key www.ipses.com
Board Section
Serial number
Remote IP address 0.0.0.0
Board status Configuration failed
Status
Status
Code 56
Reset Error
Message
UDP Read in Address Configurator.vi - Impossible to comunicate with a device. Make sure your board is properly powered and connected to the network, and

Picture 26: Error during configuration.

To configure another card, perform the necessary hardware set on the board, then type new addresses and click on the *Start* button.

Note: if you use Windows Vista on your PC, your operative system could ask you to unlock a firewall restriction when you click on the Start button. Confirm the unlocking of the firewall restriction, otherwise the communication of the software via Ethernet will be interdicted from the operative system.

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PRODUCT CODE

Code	Description
WEB-ADIO	WEB-ADIO control card
WEB-ADIO -DIN	WEB-ADIO control card mounted on a universal support for DIN rail
ETH-CABLE	Ethernet cable to connect the card

TECHNICAL FEATURES

Power supply: external, from 15V to 32V (continuous current)

Maximum current consumption: 100mA @15Vdc, 50mA @32Vdc

Working temperature: from 0°C up to +60°C

Storage temperature: from -40°C up to +85°C

Interface toward PC: RJ45 Ethernet connector

Card dimensions: 160 x 100 x 20 mm (6.30 x 3.94 x 0.79 inches)

Inputs:

Digital interface: eight optocoupled inputs

Maximum applicable voltage:	36V
Input Impedance:	≈ 2.5Kohm
Logical LOW level:	< 1V
Logical HIGH level:	> 2.5V
Maximum absorbed current:	10mA

Analogical interface: eight calibrated inputs in common mode configuration

Maximum applicable voltage:	10V
Input impedance:	> 1Mohm
Maximum absorbed current:	0.1mA
Resolution of sampling (ADC):	10bit

The "+" and "-" terminals referred to analogical channel have a 10V voltage across their heads, useful to power the analogical transducers.

Outputs:

Digital interface: eight optocoupled outputs in an open-collector configuration

Maximum output voltage:	36V
Maximum output current:	150mA
Response average time:	100µs

Analogical interface: eight calibrated voltage outputs, with low impedance driver

Maximum output voltage:	10V
Maximum output current:	± 25mA

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Response average time: 6ms
DAC resolution: 10bit
The “+” and “-” terminals referred to analogical channel have a 10V voltage across their heads, useful to power the analogical actuators.

Protection:

For the digital interfaces there are optocouplers with 2.500V_{RMS} maximum operative isolation voltage.
For the analogical input interface there is an overvoltage protection on every inputs.

Supported protocols:

Telnet: the card can work as a telnet server
HTTP: the card can work as a web server
SNMP: the card can work as an SNMP server

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OTHER AVAILABLE I/O CARDS

IO-69: Input/output Card with 6 inputs and 9 relay outputs and USB interface

IO-69-USB is a self-powered card to manage six optocoupled inputs and nine relay outputs with USB interface.

A timeout control allows to protect the connecting devices, turning off all the outputs if it does not receive commands from the host within a time configurable through software.

Furthermore, there is the possibility to program all the outputs so that each one will activate only when inputs reach assigned conditions: in this case, **IO- 69** acts like a programmable logic controller (PLC).

The card is produced in two versions: with single pole double throw relay (SPDT) and with single pole single throw relay (SPST).

General technical features:
Power supply: selfpowered thorugh USB
Working temperature: from 0°C up to + 60°C
Storage temperature: from -40°C up to + 85°C
Size: European format card (100 x 160 mm - 3,94 x 6,30 inches)

USB port technical features:
1 type B port, compatible with USB 2.0, autonomously powered for the host connection

Possibility to connect directly to an host port up to 256 cards for a maximum of 1.536 inputs and 2.304 outputs.

Technical features of inputs:
Number of inputs: six
Operative Voltage: independently selectable for each input at 5V/12V/24V (DC)
Protection: optocouplers with 2.500V_{RMS} maximum operative voltage
Connectors: pitch terminal block

Technical features of outputs:
Number of outputs: nine
SPDT version:
- Type: relay single pole double throw
- Max switching current: 0,25A
- Max carrying current: 0,5A
- Max switching voltage: 70V_{AC}/100V_{DC}, potential free
- Max contact resistance: 200mΩ

SPST version:
- Type: relay single pole single throw
- Max switching current: 0,5A
- Max carrying current: 1A
- Max switching voltage: 100$V_{AC/DC}$, potential free
- Max contact resistance: 150mΩ

Isolation voltage between coil and contacts: 500V_{DC}.

Connectors: pitch terminal block

Timeout control to turn off all the outputs if it does not receive commands from the host within a time configurable through software.

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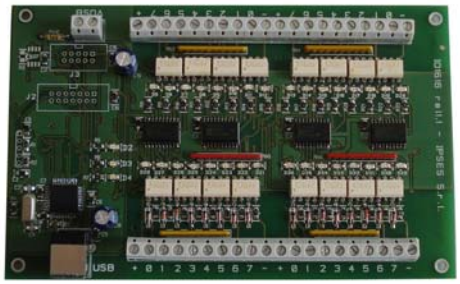
IO-1616: Input/output Card with 16 inputs and 16 outputs and USB interface



IO1616 is a self powered card to manage sixteen optoisolated inputs and sixteen optoisolated outputs with USB interface.

IO1616 can be directly connected to PLC, to input devices from operator and to other I/O systems.

On request, an integrated temperature sensor allows to know in real time the temperature of the system IO1616 is placed in.

General technical features:

Power supply: self-powered thorugh USB
Working temperature: from 0°C up to + 60°C
Storage temperature: from -40°C up to + 85°C
Size: European format card (100 x 160 mm - 3,94 x 6,30 inches)

USB port technical features:

1 type B port, compatible with USB 2.0, autonomously powered for the host connection

- Possibility to connect directly to an host port up to 128 cards, cards for a maximum of 2.048 inputs and 2.048 outputs

Temperature sensor technical features:

Resolution: 0,0625°C
Accuracy: from ±1°C to ±3°C, depending on temperature range.

Timeout control to turn off all the outputs if it does not receive commands from the host within a time configurable through software.

Technical features of inputs:

Number of inputs: sixteen
Operative voltage: from 3,3V_{DC} up to 36V_{DC}
Max current absorbed: 10mA (on each input)
Input impedance: ≈ 2.5KΩ
Logic low level: < 1V
Logic high level: > 2.5V
Port read average time execution: 15 ms
Protection: optocouplers with 2.500V_{RMS} maximum operative voltage
Connectors: pitch terminal block

Technical features of outputs:

Number of outputs: sixteen
Operative voltage: from 3,3V_{DC} up to 36V_{DC}
Maximum current: 150 mA
Protection: optocouplers with 2.500V_{RMS} maximum operative voltage
Connectors: pitch terminal block

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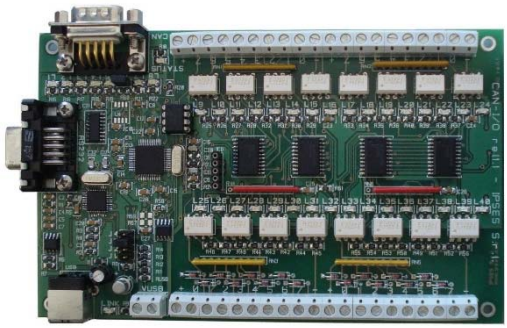
CAN-IO: Input/output Card with 16 inputs and 16 outputs with CAN, USB and RS232 interface



CAN-IO is a control unit equipped with CAN, USB and RS232 interfaces to manage sixteen optocoupled inputs and outputs. The card can work as standalone device on CAN BUS. Its configuration is achieved either through USB (in this case the board is self powered) or through RS232 interface. Easy to use and to configure, thanks to the provided *software*, **CAN-IO** is the right answer to the need to acquire and to drive digital signals through already existing CAN bus.

CAN-IO can be directly connected to PLC, to input devices by operator and to other I/O systems.

Each input and output status can be read by a field bus at any moment. Besides, thanks to LEDs fixed on, the status is shown directly on the board. An integrated temperature sensor allows to know in real time the temperature of the system CAN-IO is placed in.

General technical features:

Power supply: self-powered through USB or +5V_{DC} in stand-alone mode
Working temperature: from 0°C up to + 60°C
Storage temperature: from -40°C up to + 85°C
Size: European format card (100 x 160 mm - 3,94 x 6,30 inches)
Interfaces toward PC: 1 USB port,1 RS232 port

CAN port technical features:

- Configurable in high-speed or low-speed mode.
- Customizable baudrate (up to 1MB/s).
- Customizable address (standard or extended frame).
- Consistent with standard CAN 2.0B Active Specification
- DB9 male connector

USB port technical features:

1 type B port, compatible with USB 2.0, autonomously powered for the host connection

Technical features of inputs:

Number of inputs: sixteen
Operative voltage: 36V_{DC}
Logic low level: < 1V
Logic high level: > 2.5V
Input impedance: ≈ 2.5KΩ
Max absorbed current on each input: 10mA
Protection: optocouplers with 2.500V_{RMS} maximum operative voltage
Connectors: pitch terminal block

Technical features of outputs:

Number of outputs: sixteen
Operative voltage: from 3,3V_{DC} to 36V_{DC}
Max open collector current: 150mA
Protection: optocouplers with 2.500V_{RMS} maximum operative voltage
Connectors: pitch terminal block

Temperature sensor technical features:

Resolution: 0,0625°C
Accuracy: from ±1°C to ±3°C, depending on temperature range.

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WEB-IO: ***Input/output Card with 16 inputs and 16 outputs, Ethernet interface, integrated web, telnet*** **and SNMP** ***servers and SMTP client***

WEB-IO is a card to manage sixteen optocoupled inputs and sixteen optocoupled outputs with Ethernet interface, equipped with a web, a telnet and an SNMP servers, and an SMTP client. The web server allows to connect and to manage the card using any web browser (i. e. Internet Explorer or Firefox), with no needs to install a software on your PC. Beside, the card can be connected directly to a switch or to a router with no need to use a PC. It is also possible to develop a customized software managed by telnet service or SNMP client.

WEB-IO can be directly connected to PLC, to input devices from operator and to other I/O systems. Each input and output status can be read by a web browser or a telnet client at any moment, besides it is shown directly on the board thanks to LEDs fixed on. On request, the card can be equipped with an integrated **temperature sensor** which allows to monitor in real time the temperature around the regulator voltage module. Through expansion connectors the card can be interfaced to a **RTCLOG** (Real Time Clock and Logger) **optional module**: by this way, it can perform a log of the I/O states on a dedicated memory. **The card is available in two models**: with power supply voltage from 5V up to 9V and with power supply voltage from 7V up to 15V. WEB-IO is provided with a demo software for Windows environment, based on telnet service.

General technical features:

Power supply: external, from $5V_{DC}$ to $9V_{DC}$ or from $7V_{DC}$ to $15V_{DC}$
Working temperature: from 0°C up to + 60°C
Storage temperature: from -40°C up to + 85°C
Size: European format card (100 x 160 mm - 3,94 x 6,30 inches)
Max thickness: 20 mm (30 mm with **RTCLOG** module)
RTCLOG module interface: 2 expansion dedicated connectors
Ethernet interface: 1 Ethernet RJ45 port

Supported protocols:
Telnet: the card can work as telnet server
HTTP: the card can work as WEB server
SNMP: the card can work as SNMP server
SMTP: the card can work as SMTP client

Temperature sensor technical features:
Resolution: 0,0625°C
Accuracy: from ±1°C to ±3°C, depending on temperature range.

Technical features of inputs:
Number of inputs: sixteen
Operative voltage: from $3,3V_{DC}$ to $36V_{DC}$
Max absorbed current on each input: 10mA
Logic low level: < 1V
Logic high level: > 2.5V
Input impedance: ≈ 2.5KΩ
Protection: optocouplers with $2.500V_{RMS}$ maximum operative voltage
Connectors: pitch terminal block

Technical features of outputs:
Number of outputs: sixteen
Operative voltage: from $3,3V_{DC}$ to $36V_{DC}$
Max open collector current: 150mA
Protection: optocouplers with $2.500V_{RMS}$ maximum operative voltage
Connectors: pitch terminal block

Timeout control to turn off all the outputs if it does not receive commands from the host within a time configurable through software.

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WEB-IO-WiFi: Input/output Card with 16 inputs and 16 outputs, Ethernet and WiFi interfaces, integrated web, telnet and SNMP *servers*

WEB-IO-WiFi is a card to manage sixteen optocoupled inputs and sixteen optocoupled outputs with Ethernet and WiFi interfaces, equipped with a web, a telnet and an SNMP servers. The web server allows to connect and to manage the card using any web browser (i. e. Internet Explorer or Firefox), with no needs to install a software on your PC. Beside, the card can be connected directly to a switch or to a router, by this way it can be accessed by any PC connected to Internet. It is also possible to develop a customized software managed by telnet service or SNMP client. The board is available with built-in antenna or with ultra miniature coaxial (U.FL) connector for external antenna connection.

WEB-IO-WiFi can be directly connected to PLC, to input devices from operator and to other I/O systems. Each input and output status can be read by a web browser or a telnet client at any moment, besides it is shown directly on the board thanks to LEDs fixed on. On request, the card can be equipped with an integrated **temperature sensor** which allows to monitor in real time the temperature around the regulator voltage module.

General technical features:

Power supply: external, from $5V_{DC}$ to $32V_{DC}$
Working temperature: from 0°C u to + 60°C
Storage temperature: from -40°C up to + 85°C
Size: European format card (100 x 160 mm - 3,94 x 6,30 inches)
Max thickness: 20 mm
Ethernet interface: 1 Ethernet RJ45 port

Supported protocols:
Telnet: the card can work as telnet server
HTTP: the card can work as web server
SNMP: the card can work as SNMP server

WiFi technical features:
- Compatibility: WiFi 802.11b (2,4GHz).
- Security: WEP, WPA and WPA2.
- Transmit power: 10dBm (10mW).
- Receiver sensitivity: -83dBm
-Built-in antenna or *ultra miniature coaxial* (U.FL) connector for external antenna connection
- Configurable to connect to any Access Point, with any channel and SSID.

Technical features of inputs:
Number of inputs: sixteen
Operative voltage: from $3,3V_{DC}$ to $36V_{DC}$
Max absorbed current: 10mA (on each input)
Logic low level: < 1V
Logic high level: > 2.5V
Input impedance: ≈ 2.5KΩ
Protection: optocouplers with $2.500V_{RMS}$ maximum operative voltage
Connectors: pitch terminal block

Technical features of outputs:
Number of outputs: sixteen
Operative voltage: from $3,3V_{DC}$ to $36V_{DC}$
Max open collector current: 150mA
Protection: optocouplers with $2.500V_{RMS}$ maximum operative voltage
Connectors: pitch terminal block

Temperature sensor technical features:
Resolution: 0,0625°C
Accuracy: from ±1°C to ±3°C, depending on temperature range.

Timeout control to turn off all the outputs if it does not receive commands from the host within a time configurable through software.

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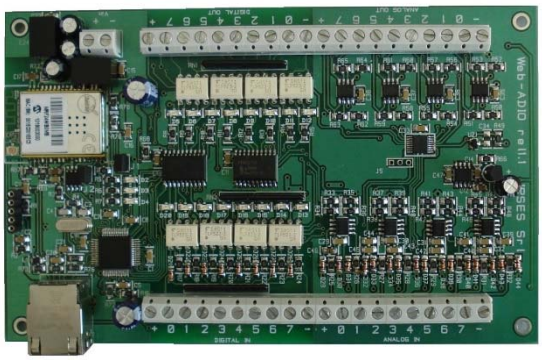
WEB-ADIO-WiFi: Input/output Card with 8 analogical inputs, 8 digital inputs, 8 analogical outputs and 8 digital outputs, Ethernet and WiFi interfaces, integrated web, telnet and *SNMP servers*



WEB-ADIO-WiFi is a card to manage 8 optocoupled digital inputs, 8 analogical inputs, 8 optocoupled digital outputs and 8 analogical outputs with Ethernet and WiFi interfaces, equipped with a web, a telnet and an SNMP servers. The web server allows to connect and to manage the card using any web browser (i. e. Internet Explorer and Firefox), with no needs to install a software on your PC Beside, the card can be connected directly to a switch or to a router with no need to use a PC. The board is available with built-in antenna or with ultra miniature coaxial (U.FL) connector for external antenna connection.

It is also possible to develop a customized software managed by telnet service.

The analogical inputs and outputs have an operative voltage from 0V to 10V, with a resolution of 10mV and are calibrated one by one.

WEB-ADIO-WiFi can be directly connected to PLC or to analogical transducer, to input devices from operator and to other I/O systems. Each input and output status can be read by a WEB browser or a telnet client at any moment, besides, the status of digital inputs and outputs it is shown directly on the board thanks to LEDs fixed on.

General technical features:

Power supply: external, from 15V_{DC} to 32V_{DC}
Working temperature: from 0°C up to + 60°C
Storage temperature: from -40°C up to + 85°C
Size: European format card (100 x 160 mm - 3,94 x 6,30 inches)
Max thickness: 20mm
Ethernet interface: 1 Ethernet RJ45 port

Supported protocols:
Telnet: the card can work as telnet server
HTTP: the card can work as web server
SNMP: the card can work as SNMP server

WiFi technical features:
- Compatibility: WiFi 802.11b (2,4GHz).
- Security: WEP, WPA and WPA2.
- Transmit power: 10dBm (10mW).
- Receiver sensitivity: -83dBm
-Built-in antenna or *ultra miniature coaxial* (U.FL) connector for external antenna connection
- Configurable to connect to any Access Point, with any channel and SSID.

Timeout control to turn off all the digital outputs if it does not receive commands from the host within a time configurable through software.

Technical features of inputs:
Number of inputs: sixteen: 8 analogical and 8 digital
Operative voltage of digital inputs: from 3,3V_{DC} to 36V_{DC} .
Operative voltage of analogical inputs: from 0V to 10V (10 bit ADC).
Max current absorbed on each input: Digital: 10mA. Analogical: 0,1mA.
Input impedance: Digital: ≈2,5kΩ. Analogical: >1MΩ.
Logic low level: < 1V
Logic high level: > 2.5V
Protection: Digital: optocouplers with 2.500V_{RMS} maximum operative voltage.
Analogical: overvoltage protection through clamp diodes.
Connectors: pitch terminal block

Technical features of outputs:
Number of outputs: sixteen: 8 analogical and 8 digital
Operative voltage of digital outputs: from 3,3V_{DC} to 36V_{DC} .
Operative voltage of analogical outputs: from 0V to 10V (10 bit DAC).
Max current on each output: Digital: 150mA. Analogical: ± 25mA.
Response average time: Digital: 100 µs. Analogical: 6ms (from 10% to 90% of the whole dynamic).
Protections Digital: optocouplers with 2.500V_{RMS} maximum operative voltage.
Connectors: pitch terminal block

LabVIEW Library for I/O cards:

A complete library for LabVIEW, giving the feasibility of I/O devices remote control, is available on request. The Library allows to implement a LabVIEW application without knowing the details of the communication protocol, making the development quick and easy.

Each library is provided with a help file which explains deeper each function included with.

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IN8-USB: ***Input Card with 8 inputs and USB interface***

IN8 is a low size auto powered control unit equipped with USB interface. IN8 can check eight galvanic isolated inputs: on each input it is possible to apply voltages regardless form the USB ground, with a maximum voltage of 30V.
Easy to use, thanks to the driver provided with and to the LabVIEW 8.2 library available on demand, IN8 also reduce installation costs.
The board low size to be easily integrated in several systems. Besides, IN8 has its inputs galvanically isolated to protect from electromagnetic disturbances and ground loops, improving its reliability and quality.
IN8 is the right answer to the need to acquire digital signals from a PC in an industrial environment.

General technical features:
Power supply: self-powered through USB
Working temperature: from 0°C up to + 60°C
Storage temperature: from -40°C up to + 85°C
Size: 80 x 75 mm (2,95 x 3,15 inches)

- Possibility to connect directly to an host port up to 256 cards, for a maximum of 2.048 inputs

USB port technical features:
1 type B port, compatible with USB 2.0, autonomously powered for the host connection

Technical features of inputs:
Number of inputs: 8
Operative voltage: from 3,3V_{DC} up to 36V_{DC}
Max current absorbed: 10mA (on each input)
Input impedance: ≈ 2.5KΩ
Logic low level: < 1V
Logic high level: > 2.5V
Port read average time execution: 12 ms
Protection: optocouplers with 2.500V_{RMS} maximum operative voltage
Connectors: pitch terminal block

The state of the inputs is shown through LEDs on the board

For further details, please consult our website: *http://www.ipses.com.*

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Our pool consists of highly competent professionals whose experience in this field is extremely strong. Thanks to constant updating and technical development, IPSES is a leading company, combining the dynamism of a young group into the competence and reliability of a qualified staff.

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SUPPORT INFORMATION

The customer is at liberty to contact the relevant engineer at IPSES S.r.l. directly.

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Email	:	support@ipses.com

PROBLEM REPORT

The next page is a standard template used for reporting system problems. It can be copied and send as a fax. Alternative bugs may be reported by emails, in this case please insure that the mail contains similar information listed in the *Engineering Problem Report* form.

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ENGINEERING PROBLEM REPORT

Problem describer

Name			**IPSES s.r.l.** **Via Suor Lazzarotto, 10** **Cesate (MI)** **Italy** **Fax (+39) 02 700403170** **e-mail *support@ipses.com***
Company			
Date	Tel.	Fax	

Product

Name	Version	Serial No.

Report Type (bug, change request or technical problem)

Major bug	☐	Urgency:	
Minor bug	☐	High	☐
Change request	☐	Medium	☐
Technical problem	☐	Low	☐

Problem Description

Reproduction of Problem

IPSES s.r.l. Action notes

Received by	Date	Report No.	Action

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(Product code WEB-ADIO Rel. 01.02.0001)

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